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Breakage Points for Two Corn Translocation Series

Maintained at the California Institute of Technology

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Agricultural Research Service
U. S. DEPARTMENT OF AGRICULTURE
in cooperation with
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CONTENTS

	Page
Introduction	1
Background	1
Materials and Methods	2
Presentation	2

Prepared by

Crops Research Division
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UNITED STATES DEPARTMENT OF AGRICULTURE

in cooperation with

California Institute of Technology

BREAKAGE POINTS FOR TWO CORN TRANSLOCATION SERIES MAINTAINED AT THE CALIFORNIA INSTITUTE OF TECHNOLOGY[1]

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INTRODUCTION

A collection of corn translocations, isolated and maintained by Dr. E. G. Anderson at the California Institute of Technology, is being made available to corn geneticists and cytogeneticists. Data on the cytological determinations of the breakage points are frequently useful in studies involving translocations. The data on breakage-point positions for two of the five series of translocations that are being studied cytologically are complete; they are compiled here as an aid in such studies.

The first series is made up of the translocations collected prior to 1947. This series includes some of the first observed in corn. Many of this series have been studied by Dr. Anderson to determine the linkage of the breakage points and known marker genes.

The second series came from seed exposed during the 1946 "Operation Crossroads" (Bikini exposed) and from the x-ray controls. The translocations in this series have not been given permanent symbols, and only a few of them have been tested to determine the linkage between the cytologically observed breakage points and gene markers.

The obtaining of cytological data for the breakage points in translocations of the three more recently produced series is progressing. It is planned, when these additional data are obtained, to prepare a summarized report for all the series in an effort to evaluate the effects of the different ionizing treatments used.

BACKGROUND

The present writer started in this field of research in 1946; at that time the breakage points of approximately 50 of the translocations in the first series had been determined.

Assigning a definite position for the breakage points of a reciprocal translocation in corn from cytological preparation of pachytenes in pollen-mother-cells was started in 1930 by McClintock, and continued by the studies of Cooper and Brink, Burnham, and Anderson.[2]

Burnham reviewed the works on "Chromosomal Interchanges in Plants" and gave the advancements that followed the above early studies of the cytological placement of breakage points in corn translocations.

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[1] Cooperative investigation between the Crops Research Division, Agricultural Research Service, U.S.D.A., and the California Institute of Technology, Pasadena, Calif.

[2] Anderson, E. G. A chromosomal interchange in maize involving the attachment to the nucleolus. Amer. Nat. 68: 345-350. 1934.
Burnham, C. R. An interchange in maize giving low sterility and chain configurations. Proc. Nat. Acad. Sci. 18: 434-440. 1932.
Burnham, C. R. Chromosomal interchanges in plants. Bot. Rev. 22: 419-552. 1956.
Cooper, D. C. and R. A. Brink. Cytological evidence for segmental interchange between non-homologous chromosomes in maize. Proc. Nat. Acad. Sci. 17: 334-338. 1931.
McClintock, B. A cytological demonstration of the location of an interchange between two non-homologous chromosomes of *Zea mays*. Proc. Nat. Acad. Sci. 16: 791-796. 1930.

MATERIAL AND METHODS

The data being presented give the breakage points determined from cytological preparations of pachytenes for the 50 translocations reported by earlier investigators (some of which were isolated also at the Institute) and for the many additional ones isolated at the Institute to complete the series (series 1). The data also give the breakage points for the complete series 2.

An analysis of the cross configurations at pachytene requires preparations that show the centromeres, the midpoint of the cross, and the distal parts of the chromosome arms involved. For the present investigations, material giving inferior preparations was usually replaced by material grown the following season under more favorable conditions.

The pinpointing of the breakage points in a translocation is made difficult because of the possibility that the cross has not opened up equally on both sides of the breakage points, and because of the possibility that the pairing may be partly nonhomologous even when close pairing occurs up to the cross. Preparations from homozygous translocations were rarely helpful, since in most instances the areas adjacent to the breakage points were too similar to show where the exchanges had occurred.

The proportions for the breakage points given in this report are based on measurements from camera lucida drawings. It is assumed that the breakage points are at the midpoint of the cross and that the contraction of the arms from early prophase to midprophase, the phase when most drawings were made, has been uniform over the whole length of the arm.

PRESENTATION

This report will follow the established practice of recording a breakage point as a decimal fraction, which is the ratio of the distance from the centromere to the center of the cross seen in pachytene configurations, to the distance from the centromere to the end of the chromosome involved.

Tables 1 and 2 give the mean breakage points for each translocation from the early and the "Crossroads" series, respectively. Each breakage position is preceded by the number of the chromosome involved and by either the letter S to indicate that the break was in the short arm or L to indicate that the break was in the long arm of the chromosome. These tables also give the number of drawings available for calculating the breakage points of each translocation. The measurements from the drawings of each translocation gave the average or mean breakage points given in the tables.

There is a certain amount of variation around each mean, which may be expressed by calculating the standard deviations or the standard error. However, in most instances the number of drawings were too few to warrant a statistical treatment, and only four translocations have been selected to illustrate the actual variation around the mean. The breakage-point positions and standard errors of these four translocations are as follows:

For T3-10c they are 3L.22, SE ± .014, and 10L.30, SE ± .017
For T1-10g they are 1S.80, SE ± .014, and 10L.21, SE ± .019
For T1-5(5225) they are 1S.75, SE ± .021, and 5S.53, SE ± .023
For T2-4(6266) they are 2L.40, SE ± .024, and 4L.27, SE ± .020

Such variations can be visualized more readily when shown graphically. The following eight bar graphs (figs. 1-4) for the above four translocations were prepared to illustrate the variations around the eight mean positions.

Table 3 lists the data of tables 1 and 2, with the translocations arranged in the order of the chromosomes. The breakage points are arranged in order from the distal position in the short arm, through the centromere to the distal position in the long arm for each chromosome.

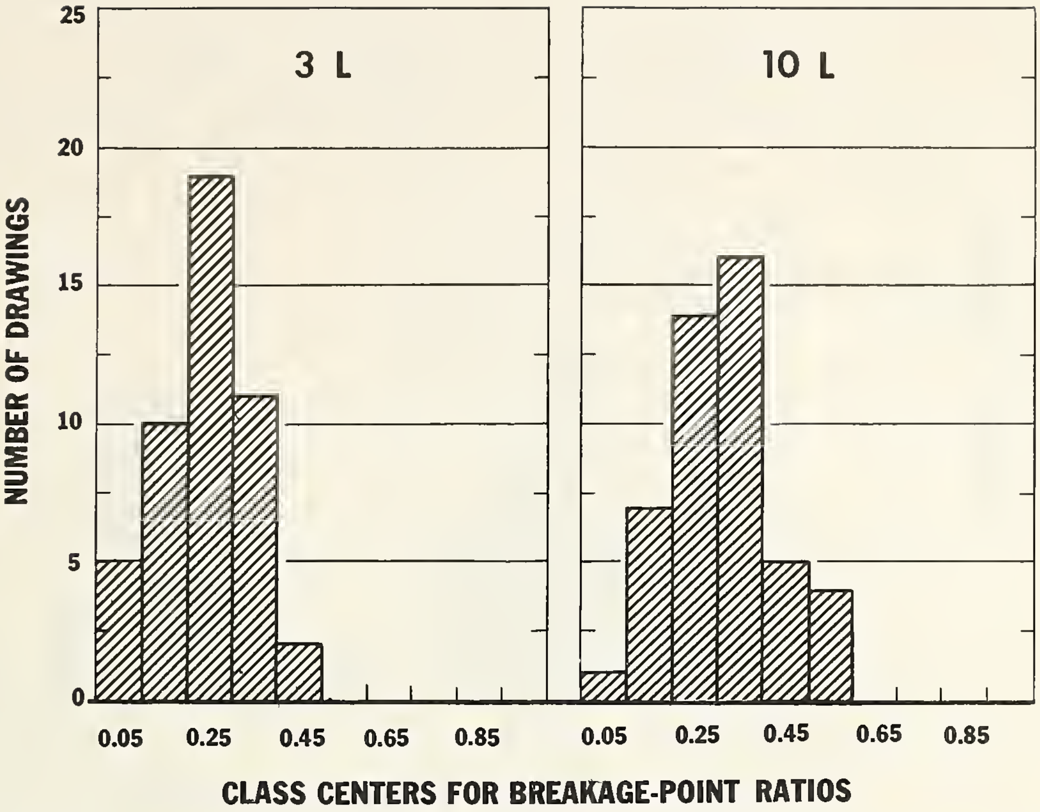

Figure 1.--Frequency distributions of the breakage-point ratios observed in drawings of chromosome arms 3L and 10L involved in translocation T3-10c.

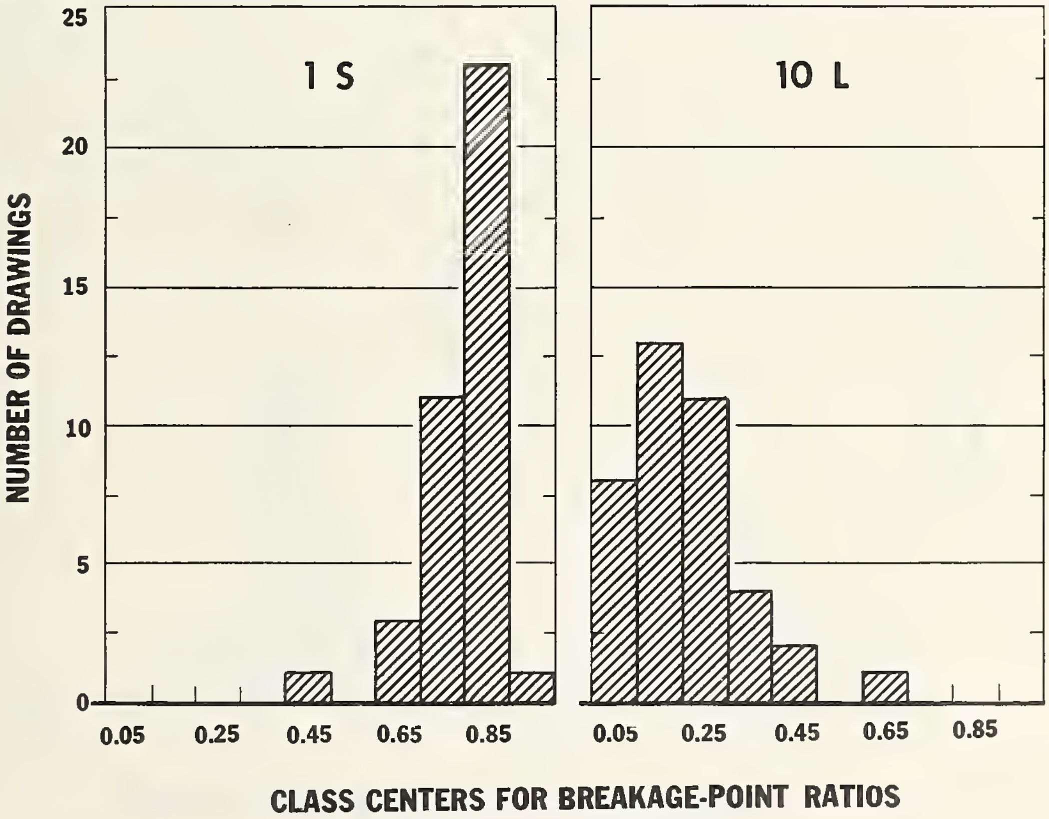

Figure 2.--Frequency distributions of the breakage-point ratios observed in drawings of chromosome arms 1S and 10L involved in translocation T1-10g.

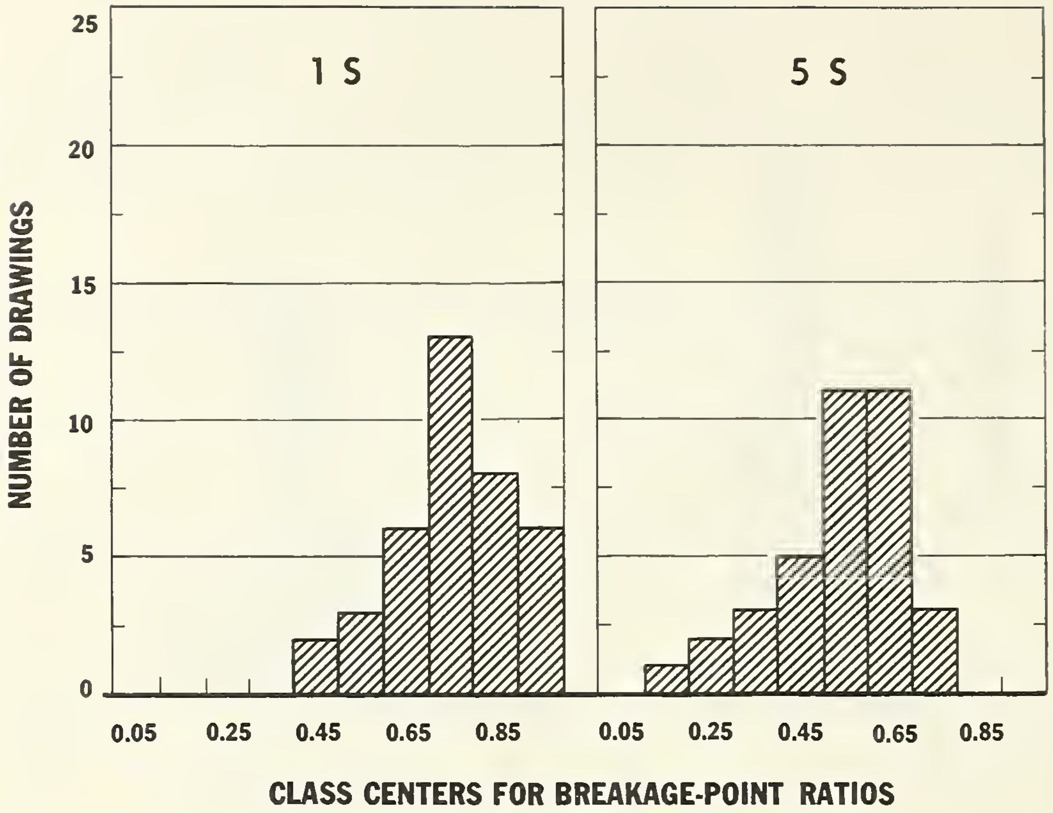

Figure 3.--Frequency distributions of the breakage-point ratios observed in drawings of chromosome arms 1S and 5S involved in translocation T1-5(5525).

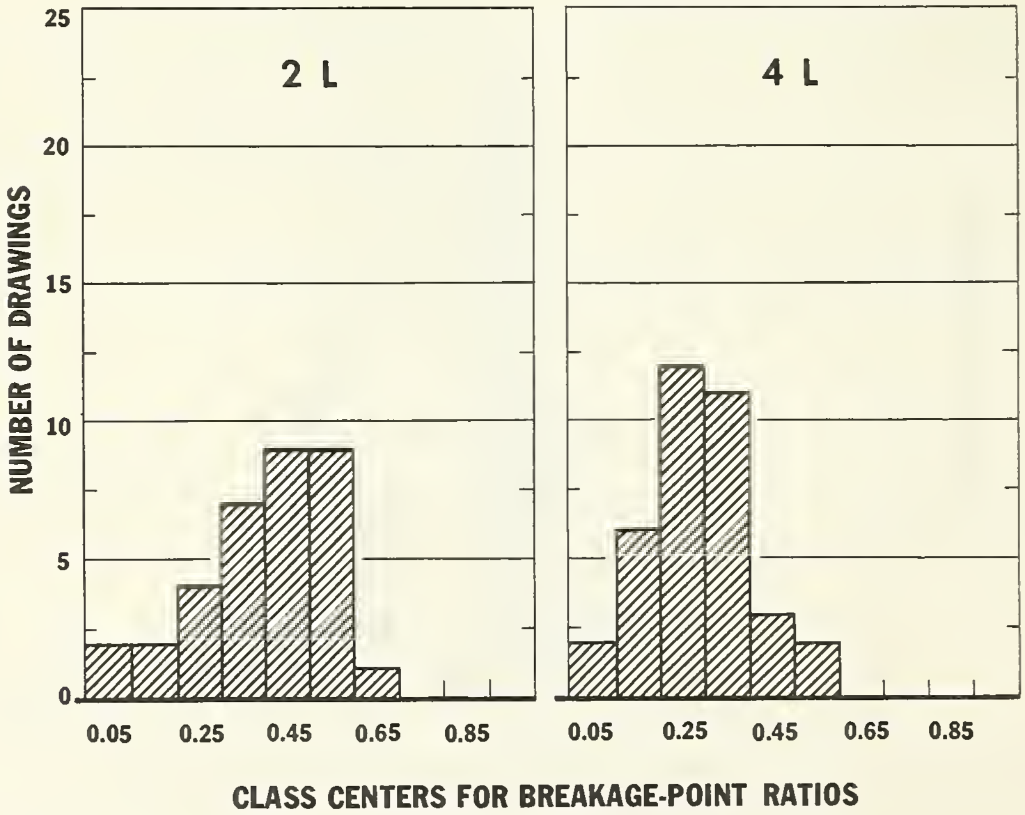

Figure 4.--Frequency distributions of the breakage-point ratios observed in drawings of chromosome arms 2L and 4L involved in translocation T2-4(6266).

TABLE 1.--The mean position for the breaks in the chromosome translocations of series 1 at the California Institute of Technology.

(Translocations followed by an asterisk (*) have not been given permanent symbols.)

Translocation	Mean position of breaks		Source of data--	
	Ratio	Ratio	Plants No.	Drawings No.
1-2b	1S.43	2S.36	3	6
1-2c	1S.77	2L.33	4	13
1-2d	1S.78	2L.56	3	7
1-2e	1S.61	2L.47	6	11
1-3a	1S.15	3L.17	3	6
1-3c	1S.14	3L.14	3	6
1-3d	1L.61	3S.75	5	11
1-3e	1L.58	3L.45	2	4
1-3f	1L.17	3L.11	2	4
1-3g	1L.17	3L.13	1	3
1-3h	1S.06	3L.04	3	8
1-3i	1L.68	3S.30	5	16
1-3j	1L.11	3L.13	6	11
1-3k	1S.17	3L.34	6	19
1-4a	1L.51	4S.69	2	7
1-4b	1S.55	4L.83	6	12
1-4c	1L.33	4S.23	8	16
1-4e	1L.45	4S.27	2	2
1-4f	1L.25	4L.16	3	6
1-4g	1L.95	4L.35	6	20
1-4h	1S.94	4L.52	2	6
1-4 (K-40)*	1S.13	4S.42	2	7
1-5a	1L.52	5L.42	2	5
1-5b	1S.17	5L.10	4	8
1-5c	1L.34	5L.29	2	7
1-5e	1L.03	5L.09	2	6
1-5f	1L.07	5L.09	7	14
1-5g	1L.58	5L.85	4	8
1-5h	1L.18	5L.53	5	14
1-5i	1S.71	5S.74	3	10
1-6a	1L.20	6L.54	2	7
1-6c	1S.25	6L.27	2	5
1-6d	1L.13	6S.74	4	7
1-6e	1S.37	6L.21	2	4
1-6f	1L.32	6L.42	5	11
1-6g	1L.16	6L.84	3	6
1-6h	1L.03	6L.17	4	8
1-7a	1L.28	7L.13	2	3
1-7b	1L.53	7L.12	2	6
1-7c	1L.39	7L.14	1	3
1-7d	1L.81	7S.44	3	7
1-7e	1L.39	7L.11	4	11
1-7f	1S.72	7L.80	4	10

TABLE 1.--Continued.

Translocation	Mean position of breaks		Source of data--	
	Ratio	Ratio	Plants No.	Drawings No.
1-7f	1S.10	7S.50	2	4
1-7g	1S.79	7S.22	1	3
1-7h	1L.46	7L.19	4	10
1-7i	1S.31	7L.26	3	10
1-7j	1L.20	7L.61	2	7
1-7 (A-37)*	1L.10	7L.56	5	11
1-8a	1L.41	8S.52	2	6
1-8b	1L.59	8L.82	3	8
1-8c	1L.94	8L.89	2	2
1-9a	1S.13	9L.15	3	8
1-9b	1L.50	9L.60	3	10
1-9c	1S.48	9L.22	3	9
1-9d	1L.42	9L.25	5	11
1-10a	1L.29	10L.33	11	20
1-10b	1L.19	10S.39	2	4
1-10c	1L.43	10L.74	6	9
1-10d	1L.50	10L.68	11	22
1-10e	1L.16	10L.31	7	8
1-10f	1S.04	10L.30	7	14
1-10g	1S.80	10L.21	26	39
1-10 (B-29)*	1L.93	10L.26	4	12
2-3b	2L.45	3L.08	6	9
2-3c	2S.46	3S.52	2	6
2-3d	2L.67	3L.48	2	6
2-3e	2S.76	3L.48	4	10
2-3f	2L.35	3S.60	4	12
2-3g	2L.21	3L.21	7	8
2-3h	2L.14	3L.07	2	6
2-3 (I-10)*	2L.19	3S.51	7	22
2-3*	2L.79	3S.90	1	4
2-4a	2L.30	4L.21	5	7
2-4b	2L.81	4L.53	3	6
2-4c	2L.81	4S.09	3	9
2-4d	2L.17	4L.45	8	16
2-4e	2L.31	4S.47	3	7
2-4f	2L.75	4L.12	3	7
2-4g	2L.13	4S.31	5	8
2-4j	2S.19	4L.34	1	3
2-4k	2L.13	4L.04	5	12
2-4l	2L.59	4S.40	3	8
2-4m	2L.34	4S.47	3	7
2-5a	2L.14	5L.15	2	5
2-5b	2L.06	5S.09	3	10
2-5c	2L.16	5S.48	6	17
2-5d	2L.91	5L.86	2	3

TABLE 1.--Continued.

Translocation	Mean position of breaks		Source of data--	
	Ratio	Ratio	Plants No.	Drawings No.
2-5e	2S.19	5S.28	4	14
2-5f	2L.91	5L.10	3	7
2-5g	2S.79	5S.24	4	11
2-5 (A-16)*	2L.34	5S.30	8	9
2-6a	2L.28	6L.20	3	5
2-6b	2S.69	6L.49	1	4
2-6c	2L.37	6L.25	2	6
2-6d	2L.41	6L.45	3	8
2-6e	2L.18	6L.20	4	9
2-6f	2L.79	6L.87	10	19
2-6 (78)*	2L.19	6L.29	3	9
2-7b	2L.37	7L.12	2	6
2-7c	2L.47	7S.34	2	6
2-7d	2L.16	7L.18	2	7
2-7e	2L.82	7L.63	3	9
2-7f	2L.30	7L.68	2	6
2-8b	2L.20	8L.18	3	9
2-8c	2S.15	8S.11	2	6
2-8d	2L.05	8L.10	2	5
2-8e	2L.07	8L.10	5	10
2-8f	2 nr. ctr.	8 nr. ctr.	3	4
2-8g	2L.71	8S.71	5	11
2-8h	2L.23	8L.22	2	6
2-8 (84)*	2L.32	8L.30	2	8
2-9a	2S.36	9L.58	7	17
2-9b	2S.18	9L.22	2	7
2-9c	2S.49	9S.33	5	10
2-9d	2L.83	9L.27	3	10
2-9*	2S.27	9L.72	1	2
2-10a	2L.16	10L.55	2	5
2-10b	2S.50	10L.75	8	16
2-10 (I-3)*	2L.30	10S.40	3	6
3-4 (A-21)*	3L.07	4L.85	6	18
3-5a	3L.28	5L.60	6	14
3-5b	3L.61	5L.57	4	9
3-5c	3L.62	5L.27	2	6
3-5e	3S.34	5S.16	3	10
3-5g	3L.01	5S.73	3	8
3-5h	3L.55	5L.22	3	10
3-5 (B-104)*	3L.23	5L.20	2	6

TABLE 1.--Continued.

Translocation	Mean position of breaks		Source of data--	
	Ratio	Ratio	Plants No.	Drawings No.
3-6a	3L.06	6L.30	4	11
3-6b	3S.73	6S.82	4	12
3-6c	3S.56	6L.54	4	9
3-6d	3L.23	6L.82	4	12
3-7a	3S.25	7L.18	2	6
3-7b	3S.92	7L.03	4	10
3-7c	3L.46	7L.45	3	10
3-7d	3L.64	7L.81	5	12
3-7e	3L.25	7S.56	6	8
3-8a	3L.41	8L.61	3	9
3-8b	3L.16	8L.23	5	11
3-8c	3S.23	8L.85	3	8
3-8e	3S.36	8L.21	5	12
3-8f	3L.08	8L.10	2	4
3-8g	3L.12	8L.19	4	11
3-8h	3L.53	8S.46	2	9
3-8 (B-31)*	3L.63	8 nr. ctr.	2	6
3-9a	3L.11	9L.16	2	6
3-9b	3L.48	9L.53	1	4
3-9c	3L.09	9L.12	6	12
3-9d	3L.13	9L.26	9	9
3-9f	3L.63	9S.69	7	16
3-9g	3L.40	9L.14	3	7
3-9h	3L.09	9L.33	4	9
3-10a	3L.16	10L.22	7	12
3-10b	3L.19	10L.27	2	3
3-10c	3L.22	10L.30	27	47
4-5a	4L.19	5S.29	1	3
4-5b	4L.76	5L.68	3	10
4-5c	4S.34	5L.27	2	7
4-5d	4S.21	5L.22	4	11
4-5e	4S.41	5S.32	2	7
4-5g	(4S.38	5L.30	4	11
	(4L.27	5S.70	3	6
4-5h	4L.13	5L.08	6	13
4-5i	4L.10	5S.15	4	9
4-5j	4L.21	5L.36	4	11
4-5k	4S.06	5L.13	4	5
4-6a	4L.37	6L.43	2	5
4-6b	4S.80	6L.16	7	13
4-6c	4S.33	6S.83	6	11
4-6d	4L.49	6L.53	3	11
4-6e	4S.62	6L.56	4	8
4-7a	4S.32	7L.07	2	7

TABLE 1.--Continued.

Translocation	Mean position of breaks		Source of data--	
	Ratio	Ratio	Plants No.	Drawings No.
4-8a	4S.59	8L.19	3	7
4-8b	4S.18	8L.16	6	8
4-9a	4L.16	9L.58	5	6
4-9b	4L.90	9L.29	3	8
4-9c	4L.82	9L.29	10	23
4-9d	4L.12	9L.17	4	13
4-9e	4S.53	9L.26	3	12
4-9f	4L.55	9L.18	7	20
4-9g	4S.27	9L.27	4	13
4-10b	4L.15	10L.60	15	24
4-10c	4S.64	10L.18	9	18
4-10d	4S.36	10L.36	3	10
4-10e	4L.14	10L.14	3	9
4-10f	4L.94	10L.14	4	11
5-6a	5L.35	6L.43	4	6
5-6b	5L.72	6L.21	4	6
5-6c	5L.81	6L.08	4	8
5-6d	5S.64	6S.89	2	6
5-6e	5L.11	6L.60	4	12
5-6f	5S.37	6S.76	3	10
5-7a	5L.78	7L.72	2	7
5-7b	5L.18	7S.36	3	7
5-7c	5L.42	7L.72	2	7
5-7d	5S.63	7S.33	3	9
5-7e	5S.40	7S.18	4	14
5-7f	5L.80	7L.85	4	11
5-8a	5L.49	8S.58	2	4
5-8b	5S.23	8L.23	10	20
5-8c	5S.24	8L.20	4	6
5-8d	5S.55	8L.12	5	16
5-8f	5L.02	8S.08	3	8
5-8g	5L.28	8S.44	3	6
5-8 (A-50)*	5S.07	8L.11	2	7
5-9a	5L.69	9S.17	3	7
5-9b	5L.68	9L.44	2	7
5-9c	5S.07	9L.10	3	11
5-9d	5L.14	9L.10	2	6
5-9e	5L.46	9L.74	8	23
5-9 (B-94)*	5S.17	9L.27	4	7
5-9 (B-91)*	5S.23	9L.21	5	9
5-10a	5L.14	10S.54	2	5
5-10b	5L.09	10S.25	2	7
5-10 (X57-16)*	5S.42	10L.42	3	6
6-7a	6L.73	7L.68	3	7

TABLE 1.--Continued.

Translocation	Mean position of breaks		Source of data--	
	Ratio	Ratio	Plants No.	Drawings No.
6-8a	6L.41	8L.80	5	13
6-8b	6L.79	8S.76	3	8
6-8c	6L.27	8L.50	5	12
6-8d	6L.51	8L.77	2	8
6-9a	6S.79	9L.40	1	3
6-9b	6L.10	9S.37	4	10
6-9c	6L.15	9L.29	5	12
6-9d	6S.73	9L.82	9	20
6-9e	6L.18	9L.24	2	6
6-10a	6L.75	10L.15	3	7
6-10b	6L.12	10L.29	3	8
6-10c	6L.51	10S.36	1	2
6-10d	6L.16	10S.29	7	12
6-10e	6L.14	10S.43	13	27
6-10f	6S.92	10S.28	3	8
6-10g	6L.85	10L.20	4	12
6-10h	6L.47	10L.87	6	14
7-9a	7L.63	9S.07	2	5
7-9b	7S.76	9S.19	4	10
7-9c	7L.14	9L.22	2	7
7-10a	7L.23	10L.06	2	3
8-9a	8L.13	9L.38	1	2
8-9b	8S.67	9L.75	5	13
8-9c	(8L.14	9L.16	5	12
	(8S.58	9S.26	1	2
8-9d	8L.09	9S.16	4	8
8-9e	8L.32	9L.25	2	4
8-10a	8L.48	10S.48	5	7
8-10b	8 nr. ctr.	10 nr. ctr.	15	23
8-10c	8L.41	10S.56	2	6
8-10d	8L.39	10L.16	4	11
8-10e	8L.84	10S.37	2	5
8-10 (K-7)*	8L.07	10S.22	2	6
9-10a	9L.14	10L.92	10	15
9-10b	9S.13	10S.40	6	14
9-10 (A-75)*	9L.24	10L.30	2	6

TABLE 2.--The mean position for the breaks in the chromosome translocations of the "Crossroads" series (Bikini exposed and X-ray controls).

Temporary symbol	Translocation	Mean position of breaks		Source of data--	
		Ratio	Ratio	Plants No.	Drawings No.
4301-39------------	3-8	3L.92	8L.82	8	10
4301-111-----------	2-3	2 nr. ctr.	3 nr. ctr.	6	11
4302-31------------	1-7	1S.15	7L.12	4	12
4302-116-----------	5-8	5L.06	8S.11	1	3
4303-9-------------	9-10	9L.26	10S.44	6	12
4303-12------------	3-8	3 nr. ctr.	8 nr. ctr.	2	6
4303-74------------	2-3	2L.73	3L.68	1	4
4304-82------------	4-9	4S.22	9L.37	7	22
4305-8-------------	4-5	4S.27	5L.28	12	28
4305-12------------	5-9	5L.41	9L.64	2	4
4306-4-------------	5-7	5S.32	7L.35	4	11
4307-4-------------	1-8	1S.42	8L.61	5	12
4307-12------------	6-10	6L.74	10S.71	2	7
4307-12------------	4-9	4S.48	9L.55	8	17
4308---------------	1-4	1S.65	4L.58	3	11
4314---------------	1-3	1L.81	3L.89	6	13
4331---------------	1-5	1L.03	5S.02	1	3
4337---------------	6-7	6L.37	7L.13	4	6
4340---------------	3-8	3L.88	8L.72	7	15
4341---------------	4-6	4S.37	6S.81	6	10
4347---------------	6-10	6L.65	10S.81	5	17
4349---------------	3-6	3S.58	6L.70	7	16
4352---------------	5-9	5L.48	9L.61	11	31
4356---------------	7-10	7L.70	10 nr.ctr.	2	7
4363---------------	7-9	7 nr. ctr.	9 nr. ctr.	9	10
4369---------------	2-3	2S.19	3S.26	5	11
4372---------------	2-6	2S.37	6S.81	1	3
4373---------------	4-9	4L.29	9L.39	7	20
4374---------------	2-4	2L.15	4L.23	1	3
4382---------------	3-10	3S.38	10L.29	7	21
4383---------------	3-10	3S.23	10L.30	4	8
4384---------------	5-10	5L.13	10L.79	7	26
4394---------------	2-6	2S.91	6L.12	4	13
4398---------------	1-9	1L.51	9S.19	1	3
4400---------------	2-7	2L.24	7L.32	5	13
4405---------------	1-7	1S.43	7S.46	4	11
4413---------------	2-4	2S.84	4S.32	7	10
4414---------------	2-8	2L.12	8L.14	4	11
4420---------------	1-7	1L.47	7L.90	1	2
4422---------------	(7-10	7L.79	10S.43	9	21
	(	7L.33	10L.12	3	7
4444---------------	1-7	1S.65	7S.50	5	11
4447---------------	4-6	4S.28	6L.14	3	7
4453---------------	8-9	8L.86	9S.68	4	10
4456---------------	1-6	1L.71	6L.30	7	12
4461---------------	4-6	4S.86	6L.17	4	7
4464---------------	1-2	1S.53	2L.28	6	11
4472---------------	4-5	4S.25	5S.19	6	11
4483---------------	4-7	4L.39	7L.61	4	11
4484---------------	2-10	2S.09	10L.14	6	14

TABLE 2.--Continued.

Temporary symbol	Translocation	Mean position of breaks		Source of data--	
		Ratio	Ratio	Plants No.	Drawings No.
4505	6-9	6L.13	9 nr. ctr.	6	8
4519	2-7	2L.65	7L.66	4	11
4536	7-8	7L.34	8L.47	5	15
4545	6-7	6L.25	7S.73	3	5
4573	6-7	6L.22	7L.27	2	5
4578	2-5	2L.92	5S.71	4	11
4593	8-9	8L.69	9L.65	7	21
4594	6-7	6L.52	7S.67	5	12
4597	1-5	1L.52	5S.43	6	16
4613	1-5	1S.78	5L.22	5	17
4626	3-8	3S.30	8L.31	1	3
4635	3-5	3S.44	5S.48	8	19
4636	5-8	5L.23	8L.79	14	25
4643	8-9	8S.37	9L.11	6	11
4662	3-4	3S.24	4S.67	9	16
4666	5-6	5L.35	6L.86	4	11
4669	5-6	5L.13	6L.40	4	12
4670	3-7	3S.20	7L.76	4	12
4676	1-8	1L.04	8S.06	3	6
4685	1-8	1S.20	8L.21	6	16
4692	1-4	1L.46	4L.15	2	6
4698	4-7	4L.08	7L.74	5	12
4711	2-8	2S.86	8L.67	4	13
4713	3-4	3L.21	4S.59	1	3
4713	8-9	8L.70	9 nr. ctr.	1	3
4717	2-6	2L.77	6L.27	2	7
4726	3-4	3S.16	4L.15	6	13
4727	3-9	3L.54	9L.42	5	14
4741	2-5	2S.47	5L.47	6	10
4742	1-7	1S.95	7L.03	4	11
4748	1-8	1L.12	8L.15	5	11
4759	1-3	1L.39	3L.20	4	8
4773	3-7	3S.11	7L.08	6	11
4775	8-9	8L.42	9L.68	3	10
4778	6-9	6S.80	9L.30	9	22
4790	5-9	5L.34	9L.45	3	8
4801	5-10	5L.91	10L.23	6	18
4817	5-9	5 nr. ctr.	9 nr. ctr.	5	13
4824	7-8	7L.83	8L.25	6	15
4832	1-5	1S.20	5L.12	1	4
4833	6-10	6L.83	10S.78	2	7
4837	1-7	1S.73	7L.55	7	21
4871	5-9	5L.71	9S.38	5	13
4872	3-8	(3L.18	8L.15	8	10
		(3S.22	8S.37	8	10
4873	3-5	3S.24	5S.16	4	8
4874	3-8	3L.28	8L.32	2	5
4880	3-5	(3S.25	5S.12	5	9
		(3L.18	5L.18	2	2
4885	1-10	1 nr. ctr.	10 nr.ctr.	3	11

TABLE 2.--Continued.

Temporary symbol	Translocation	Mean position of breaks		Source of data--	
		Ratio	Ratio	Plants No.	Drawings No.
4891	1-7	1L.12	7L.69	4	11
4898	3-5	3 nr. ctr.	5 nr. ctr.	2	6
4933	5-6	5S.23	6L.89	6	16
4934	5-6	5L.34	6L.89	7	13
4937	1-2	1L.10	2S.15	5	15
4963	3-9	3L.76	9L.57	14	33
4964	6-7	6S.76	7L.72	4	12
4986	1-6	1S.21	6S.78	4	14
4995	1-9	1L.19	9S.20	8	14
4997	1-9	1L.37	9S.28	4	12
5013	1-6	1S.26	6L.28	1	4
5013	5-8	5S.67	8L.59	2	5
5028	6-8	6L.21	8L.31	5	15
5045	1-5	1S.94	5L.50	7	16
5072	1-6	1S.17	6L.45	1	3
5074	7-9	7S.48	9L.53	11	26
5074	3-4	3 nr. ctr.	4 nr. ctr.	3	9
5077	1-6	1S.20	6L.60	10	23
5098	2-5	2L.13	5S.23	6	10
5143	5-7	5S.51	7L.10	3	9
5144	2-7	2S.35	7L.08	7	11
5156	3-4	3S.47	4L.67	3	10
5157	2-4	2S.86	4L.07	7	12
5179	5-7	5L.55	7L.73	4	11
5181	6-7	6S.79	7L.86	7	19
5188	5-10	5L.37	10S.65	6	23
5201	3-6	3S.37	6S.82	3	6
5208	2-9	2L.76	9L.68	2	8
5225	1-6	1L.61	6L.72	4	12
5227	4-6	4S.46	6S.84	6	12
5242	1-3	1L.90	3L.65	6	10
5253	6-10	6S.80	10L.41	6	14
5255	1-2	1S.25	2S.31	4	12
5257	2-9	2L.28	9L.20	3	10
5267	1-3	1L.72	3L.73	4	8
5273	1-10	1L.17	10L.69	7	20
5279	2-7	2S.93	7L.25	4	9
5285	3-9	3L.51	9L.49	10	23
5287	8-10	8L.17	10S.33	3	12
5290	5-10	5L.78	10S.49	3	6
5300	8-9	8L.85	9S.43	3	11
5304	2-3	2S.62	3L.29	2	5
5339	1-7	1L.24	7L.14	9	15
5339	4-8	4S.22	8L.71	8	18
5355	5-10	5S.77	10L.45	8	11
5358	5-10	5L.10	10L.76	3	7
5368	5-9	5L.87	9L.95	3	7
5368	3-6	3L.22	6L.20	2	2
5373	1-4	1L.17	4S.29	5	13
5376	1-2	1L.77	2L.08	5	11

TABLE 2.--Continued.

Temporary symbol	Translocation	Mean position of breaks		Source of data--	
		Ratio	Ratio	Plants No.	Drawings No.
5378	3-7	3L.13	7L.73	9	14
5381	7-9	7L.85	9L.78	5	17
5384	1-8	1L.10	8L.59	5	10
5386	6-8	6S.78	8S.83	1	3
5391	8-9	8L.07	9S.33	5	12
5412	4-8	4L.59	8L.95	3	10
5413	7-8	7L.09	8L.77	6	15
5419	2-6	2L.82	6S.79	11	24
5438	1-4	1L.93	4L.81	2	4
5453	1-2	1L.11	2S.58	3	6
5454	6-9	6 nr. ctr.	9S.75	4	13
5454	2-8	2L.21	8S.39	11	22
5471	3-7	3L.64	7L.58	5	15
5472)	2-6	(2S.25	6L.15	2	5
5473)		(2L.25	6L.28	3	8
5476	1-3	1L.66	3L.87	3	11
5479	7-8	7L.70	8S.21	3	12
5484	2-8	2L.24	8S.58	7	11
5488	9-10	9L.57	10L.89	10	26
5495	1-6	1S.25	6S.80	6	15
5495	2-4	2S.27	4L.12	1	4
5499	7-8	7L.05	8L.08	5	15
5512	1-5	1S.08	5L.70	5	12
5519	6-10	6S.75	10L.17	6	16
5521	3-5	3L.17	5L.48	5	18
5523	1-2	1L.27	2S.62	6	19
5525	1-5	1S.75	5S.53	18	38
5529	4-5	4S.37	5L.46	5	12
5537	1-5	1S.11	5S.15	5	6
5537	1-6	1S.31	6L.22	5	6
5539	1-2	1L.21	2L.61	3	11
5557	5-10	5L.92	10S.39	4	6
5558	3-8	3S.26	8S.74	4	8
5561	2-10	2L.35	10S.16	4	14
5566	1-4	1S.21	4L.26	3	11
5570	5-8	5S.47	8S.35	2	7
5574	4-9	4L.80	9L.87	9	12
5575	5-8	5S.21	8S.22	9	22
5583	3-8	3L.06	8L.05	2	5
5585	8-10	8 nr. ctr.	10 nr.ctr.	9	13
5588	1-8	1S.10	8S.32	3	10
5597	1-3	1S.77	3L.48	3	9
5602	2-5	2L.73	5L.77	4	12
5605	6-8	6L.36	8L.22	1	4
5614	5-9	5L.09	9L.06	9	12
5619	1-8	1L.07	8L.16	4	10
5622	1-9	1L.10	9L.12	14	27
5622	5-6	5S.94	6L.42	9	21
5629	1-4	1L.10	4L.10	2	4
5634	1-8	1L.08	8S.28	3	8

TABLE 2.--Continued.

Temporary symbol	Translocation	Mean position of breaks		Source of data--	
		Ratio	Ratio	Plants No.	Drawings No.
5643	3-9	3S.55	9L.64	4	11
5645	2-5	2L.60	5S.85	2	7
5648	2-6	2L.25	6L.19	6	12
5651	2-10	2S.71	10L.62	3	7
5653	5-10	5S.76	10L.71	6	12
5657	4-9	4L.33	9S.25	8	16
5679	5-10	5S.16	10L.15	4	11
5680	1-4	1S.87	4L.45	11	18
5685	5-6	5L.27	6L.20	6	15
5688	5-10	5L.78	10L.53	7	15
5693	1-7	1L.92	7L.18	2	6
5704	1-8	1L.96	8S.67	1	1
5711	2-9	2S.24	9L.23	7	14
5724	3-7	(3S.17	7S.20	5	7
		(3L.09	7L.10	2	3
5752	1-8	1L.36	8L.23	2	4
5756	1-4	1L.89	4L.81	7	12
5765	5-6	5S.19	6L.32	7	15
5775	3-9	3L.09	9S.24	4	5
5777	5-8	5 nr. ctr.	8 nr. ctr.	8	15
5780	6-10	6L.93	10L.13	4	14
5783	2-7	2L.66	7L.10	4	11
5788	4-9	4L.72	9L.82	6	13
5800	2-3	2S.73	3S.81	6	11
5813	1-5	1L.21	5S.96	1	1
5821	1-8	1L.65	8L.31	6	11
5828	7-8	7S.31	8L.10	4	13
5828	4-9	4L.61	9L.27	1	5
5830	2-10	2L.12	10L.12	3	7
5830	3-8	3S.06	8L.13	1	4
5831	2-9	2L.63	9S.72	1	5
5831	6-9	6L.27	9L.30	2	7
5866	5-8	5L.32	8L.77	4	12
5871	3-7	3S.29	7L.13	2	4
5874	3-5	3L.16	5L.21	5	14
5876	2-5	2L.47	5L.46	5	11
5883	1-3	1S.88	3S.60	3	8
5884	4-9	4L.40	9L.49	10	20
5891	3-4	3 nr. ctr.	4 nr. ctr.	3	7
5892	3-10	3S.17	10L.25	4	10
5896	1-2	1S.22	2S.30	5	14
5906	5-6	5S.15	6L.13	3	7
5910	1-8	1L.93	8L.67	4	11
5918	4-9	4S.24	9L.18	5	11
5920	3-4	3S.28	4L.73	3	6
5944	8-10	8L.75	10L.40	4	10
5946	1-2	(1L.15	2S.26	4	9
		(1S.06	2L.14	2	4
5951	2-4	2L.18	4S.26	8	18
5955	3-7	3L.10	7L.58	5	10

TABLE 2.--Continued.

Temporary symbol	Translocation	Mean position of breaks		Source of data--	
		Ratio	Ratio	Plants No.	Drawings No.
5964---------------	6-9	6L.47	9L.83	7	19
5982---------------	1-3	1S.77	3L.66	6	20
6019---------------	6-9	6L.27	9L.26	8	20
6057---------------	5-9	5S.15	9S.52	6	15
6061---------------	5-10	5S.60	10L.57	5	14
6062---------------	5-6	5L.20	6L.78	8	17
6063---------------	4-8	4S.02	8L.05	3	8
6128---------------	8-10	8L.43	10S.47	8	18
6178---------------	1-5	1L.04	5L.05	2	6
6187---------------	6-8	6L.19	8L.51	2	6
6189---------------	1-6	1S.23	6L.17	5	10
6197---------------	1-5	1S.02	5L.02	4	9
6200---------------	5-9	5L.81	9L.71	6	17
6222---------------	4-9	4L.03	9S.68	4	9
6225---------------	7-9	(7S.11	9L.04	2	2
		(7L.05	9S.12	3	5
6261---------------	3-8	3L.49	8L.40	6	10
6266---------------	2-4	2L.40	4L.27	19	34
6270---------------	6-9	6L.19	9L.28	8	12
6270---------------	2-3	2S.46	3L.60	5	13
6284---------------	2-3	2L.81	3L.75	3	6
6289---------------	5-8	5L.06	8L.54	3	8
6293---------------	5-7	5L.26	7L.63	3	8
6328---------------	1-9	1L.79	9L.40	1	3
6346---------------	3-5	3L.94	5L.83	4	10
6349---------------	3-6	3L.10	6L.15	3	4
6363---------------	4-8	4L.76	8L.30	2	5
6372---------------	2-7	2S.21	7L.11	2	3
6373---------------	3-8	3S.53	8L.68	2	7
6401---------------	1-5	1L.14	5S.20	2	3
6402---------------	5-8	5S.07	8L.07	5	10
6406---------------	5-8	5 nr. ctr.	8 nr. ctr.	11	24
6422---------------	1-4	1L.16	4S.11	4	9
6427---------------	7-8	7L.96	8L.28	1	4
6439---------------	3-8	3S.30	8L.15	4	12
6462---------------	3-5	3S.31	5L.47	3	9
6466---------------	3-7	3L.36	7L.14	4	8
6473---------------	3-5	3S.32	5S.26	3	9
6482---------------	5-6	5S.22	6S.77	1	5
6482---------------	7-9	7L.01	9S.97	3	7
6488---------------	8-10	8L.14	10S.34	5	11
6498---------------	6-7	6L.16	7S.48	3	7
6504---------------	4-9	4L.09	9S.83	5	8
6522---------------	5-6	5S.87	6L.70	2	7
6531---------------	7-8	7 nr. ctr.	8 nr. ctr.	2	6
6534---------------	3-4	3L.48	4L.89	3	9
6557---------------	3-7	3 nr. ctr.	7S.59	2	4
6559---------------	5-6	5S.72	6L.09	2	7
6560---------------	4-5	4S.32	5S.21	8	19
6566---------------	3-6	3L.41	6L.35	1	5

TABLE 2.--Continued.

Temporary symbol	Translocation	Mean position of breaks		Source of data--	
		Ratio	Ratio	Plants No.	Drawings No.
6575---------------	4-7	4S.38	7S.32	3	9
6580---------------	2-5	2L.09	5S.09	3	6
6587---------------	4-10	4L.55	10L.53	4	8
6591---------------	1-8	1S.18	8S.43	4	11
6598---------------	6-7	6L.43	7L.61	5	12
6612---------------	5-8	5S.59	8L.66	7	15
6623---------------	4-6	4L.18	6L.31	2	7
6653---------------	8-10	8L.04	10L.06	6	16
6656---------------	2-9	2L.32	9S.31	6	10
6662---------------	4-10	4L.04	10L.03	6	12
6671---------------	2-6	2S.22	6L.22	4	14
6673---------------	8-9	8L.35	9S.31	6	12
6691---------------	3-10	3L.30	10L.87	7	13
6695---------------	3-5	3 nr. ctr.	5 nr. ctr.	3	6
6697---------------	1-8	1L.89	8L.52	2	7
6722---------------	3-9	3S.66	9S.66	6	14
6743---------------	4-5	4L.56	5S.59	9	28
6750---------------	2-3	2L.76	3S.53	3	8
6760---------------	5-10	5S.78	10S.40	4	8
6762---------------	1-9	1S.16	9L.53	5	12
6766---------------	1-8	1L.54	8L.77	2	6
6796---------------	1-7	1S.40	7S.39	5	12
6830---------------	5-10	5 nr. ctr.	10 nr.ctr.	3	13
6831---------------	4-5	4S.32	5S.59	4	9
6853---------------	2-10	2L.79	10L.86	2	8
6861---------------	1-3	1L.04	3L.65	1	3
6862---------------	2-3	2S.39	3L.20	3	7
6873---------------	6-8	6L.21	8L.29	4	11
6883---------------	1-2	1L.63	2L.52	1	3
6884---------------	1-3	1L.17	3L.19	3	7
6885---------------	2-5	2L.63	5S.79	5	12
6885---------------	6-7	6L.33	7S.58	5	16
6891---------------	1-2	1S.14	2S.83	3	7
6892---------------	1-2	1L.30	2L.35	4	9
6899---------------	1-5	1S.32	5S.20	8	17
6921---------------	8-9	8L.85	9L.15	7	21
6926---------------	4-8	4L.60	8L.71	4	12
6931---------------	2-6	2L.24	6L.23	5	10
6978---------------	7-9	7L.62	9S.83	6	18
6981---------------	7-8	(7L.14	8S.49	4	7
		(7S.46	8L.09	1	3
6994---------------	2-4	2S.59	4L.95	2	4
7036---------------	6-7	6S.90	7L.63	3	8
7037---------------	4-6	4L.61	6S.77	3	8
7041---------------	3-9	3S.59	9L.70	6	12
7043---------------	3-5	3L.63	5L.61	5	14
7067---------------	4-7	4L.17	7S.60	2	7
7067---------------	3-6	3L.07	6L.75	1	3
7068---------------	5-8	5S.18	8L.18	1	3
7069---------------	2-8	2L.13	8L.14	2	8

TABLE 2.--Continued.

Temporary symbol	Translocation	Mean position of breaks		Source of data--	
		Ratio	Ratio	Plants No.	Drawings No.
7074	7-9	7L.03	9S.80	5	13
7078	4-5	4L.05	5L.10	6	11
7096	2-9	2S.57	9L.66	4	13
7097	1-6	1S.46	6L.62	3	8
7102	5-8	5L.48	8S.10	3	6
7103	9-10	9L.73	10L.88	4	7
7108	4-7	4S.17	7S.45	9	22
7136	4-5	4L.45	5L.33	5	12
7142	5-10	5L.73	10L.17	3	8
7149	7-8	7L.56	8L.65	8	19
7162	3-6	3L.52	6L.53	3	8
7205	5-9	5L.21	9L.90	7	14
7211	1-2	1L.57	2L.79	1	4
7212	1-5	1L.44	5S.28	3	5
7267	1-5	1L.92	5L.82	1	4
7285	2-3	2L.26	3L.39	1	4
7309	1-2	1S.90	2S.89	1	4
7328	4-6	4S.53	6S.89	1	3
7362	3-8	3L.07	8L.69	1	4

TABLE 3.--The breakage points of series 1 and the "Crossroads" series (series 2), arranged in order of the chromosomes and in order along the chromosome arms from left to right.

[Symbol: Only the lower-case symbols are permanent ones.]

Translocation	Symbol	Breakage points	
		Ratio	Ratio
1-2------	7309	1S.90	2S.89
1-2------	d	1S.78	2L.56
1-2------	c	1S.77	2L.33
1-2------	e	1S.61	2L.47
1-2------	4464	1S.53	2L.28
1-2------	b	1S.43	2S.36
1-2------	5255	1S.25	2S.31
1-2------	5896	1S.22	2S.30
1-2------	6891	1S.14	2S.83
1-2------	5946	1ctr.	2ctr.
1-2------	4937	1L.10	2S.15
1-2------	5453	1L.11	2S.58
1-2------	5539	1L.21	2L.61
1-2------	5523	1L.27	2S.62
1-2------	6892	1L.30	2L.35
1-2------	7211	1L.57	2L.79
1-2------	6883	1L.63	2L.52
1-2------	5376	1L.77	2L.08
1-3------	5883	1S.88	3S.60
1-3------	5982	1S.77	3L.66
1-3------	5597	1S.77	3L.48
1-3------	k	1S.17	3L.34
1-3------	a	1S.15	3L.17
1-3------	c	1S.14	3L.14
1-3------	h	1S.06	3L.04
1-3------	6861	1L.04	3L.65
1-3------	j	1L.11	3L.13
1-3------	f	1L.17	3L.11
1-3------	g	1L.17	3L.13
1-3------	6884	1L.17	3L.19
1-3------	4759	1L.39	3L.20
1-3------	e	1L.58	3L.45
1-3------	d	1L.61	3S.75
1-3------	5476	1L.66	3L.87
1-3------	i	1L.68	3S.30
1-3------	5267	1L.72	3L.73
1-3------	4314	1L.81	3L.89
1-3------	5242	1L.90	3L.65
1-4------	h	1S.94	4L.52
1-4------	5680	1S.87	4L.45
1-4------	4308	1S.65	4L.58
1-4------	b	1S.55	4L.83
1-4------	5566	1S.21	4L.26
1-4------	K-40	1S.13	4S.42
1-4------	5629	1L.10	4L.10
1-4------	6422	1L.16	4S.11
1-4------	5373	1L.17	4S.29
1-4-----	f	1L.25	4L.16
1-4-----	c	1L.33	4S.23
1-4-----	e	1L.45	4S.27
1-4-----	4692	1L.46	4L.15
1-4-----	a	1L.51	4S.69
1-4-----	5756	1L.89	4L.81
1-4-----	5438	1L.93	4L.81
1-4-----	g	1L.95	4L.35
1-5-----	5045	1S.94	5L.50
1-5-----	4613	1S.78	5L.22
1-5-----	5525	1S.75	5S.53
1-5-----	i	1S.71	5S.74
1-5-----	6899	1S.32	5S.20
1-5-----	4832	1S.20	5L.12
1-5-----	b	1S.17	5L.10
1-5-----	5537	1S.11	5S.15
1-5-----	5512	1S.08	5L.70
1-5-----	6197	1S.02	5L.02
1-5-----	e	1L.03	5L.09
1-5-----	4331	1L.03	5S.02
1-5-----	6178	1L.04	5L.05
1-5-----	f	1L.07	5L.09
1-5-----	6401	1L.14	5S.20
1-5-----	h	1L.18	5L.53
1-5-----	5813	1L.21	5S.96
1-5-----	c	1L.34	5L.29
1-5-----	7212	1L.44	5S.28
1-5-----	a	1L.52	5S.42
1-5-----	4597	1L.52	5S.43
1-5-----	g	1L.58	5S.85
1-5-----	7267	1L.92	5L.82
1-6-----	7097	1S.46	6L.62
1-6-----	e	1S.37	6L.21
1-6-----	5537	1S.31	6L.22
1-6-----	5013	1S.26	6L.28
1-6-----	c	1S.25	6L.27
1-6-----	5495	1S.25	6S.80
1-6-----	4986	1S.21	6S.78
1-6-----	6189	1S.23	6L.17
1-6-----	5077	1S.20	6L.60
1-6-----	5072	1S.17	6L.45
1-6-----	h	1L.03	6L.17
1-6-----	d	1L.13	6S.74
1-6-----	g	1L.16	6L.84
1-6-----	a	1L.20	6L.54
1-6-----	f	1L.32	6L.42
1-6-----	5225	1L.61	6L.72
1-6-----	4456	1L.71	6L.30

TABLE 3.--Continued.

Translocation	Symbol	Breakage points	
		Ratio	Ratio
1-7-----	4742	1S.95	7L.03
1-7-----	g	1S.79	7S.22
1-7-----	4837	1S.73	7L.55
1-7-----	f	1S.72	7L.80
1-7-----	4444	1S.65	7S.50
1-7-----	4405	1S.43	7S.46
1-7-----	6796	1S.40	7S.39
1-7-----	i	1S.31	7L.26
1-7-----	4302	1S.15	7L.12
1-7-----	f	1S.10	7S.50
1-7-----	A-37	1L.10	7L.56
1-7-----	4891	1L.12	7L.69
1-7-----	j	1L.20	7L.61
1-7-----	5339	1L.24	7L.14
1-7-----	a	1L.28	7L.13
1-7-----	c	1L.39	7L.14
1-7-----	e	1L.39	7L.11
1-7-----	h	1L.46	7L.19
1-7-----	4420	1L.47	7L.90
1-7-----	b	1L.53	7S.12
1-7-----	d	1L.81	7S.44
1-7-----	5693	1L.92	7L.18
1-8-----	4307	1S.42	8L.61
1-8-----	4685	1S.20	8L.21
1-8-----	6591	1S.18	8S.43
1-8-----	5588	1S.10	8S.32
1-8-----	4676	1L.04	8S.06
1-8-----	5619	1L.07	8L.16
1-8-----	5634	1L.08	8S.28
1-8-----	5384	1L.10	8L.59
1-8-----	4748	1L.12	8L.15
1-8-----	5752	1L.36	8L.23
1-8-----	a	1L.41	8S.52
1-8-----	6766	1L.54	8L.77
1-8-----	b	1L.59	8L.82
1-8-----	5821	1L.65	8L.31
1-8-----	6697	1L.89	8L.52
1-8-----	5910	1L.93	8L.67
1-8-----	c	1L.94	8L.89
1-8-----	5704	1L.96	8S.67
1-9-----	c	1S.48	9L.22
1-9-----	6762	1S.16	9L.53
1-9-----	a	1S.13	9L.15
1-9-----	5622	1L.10	9L.12
1-9-----	4995	1L.19	9S.20
1-9-----	4997	1L.37	9S.28
1-9-----	d	1L.42	9L.25
1-9-----	b	1L.50	9L.60
1-9----	4398	1L.51	9S.19
1-9----	6328	1L.79	9L.40
1-10---	g	1S.80	10L.21
1-10---	f	1S.04	10L.30
1-10---	4885	1ctr.	10ctr.
1-10---	e	1L.16	10L.31
1-10---	5273	1L.17	10L.69
1-10---	b	1L.19	10S.39
1-10---	a	1L.29	10L.33
1-10---	c	1L.43	10L.74
1-10---	d	1L.50	10L.68
1-10---	B-29	1L.93	10L.26
2-1----	7309	2S.89	1S.90
2-1----	6891	2S.83	1S.14
2-1----	5523	2S.62	1L.27
2-1----	5453	2S.58	1L.11
2-1----	b	2S.36	1S.43
2-1----	5255	2S.31	1S.25
2-1----	5896	2S.30	1S.22
2-1----	4937	2S.15	1L.10
2-1----	5946	2ctr.	1ctr.
2-1----	5376	2L.08	1L.77
2-1----	4464	2L.28	1S.53
2-1----	c	2L.33	1S.77
2-1----	6892	2L.35	1L.30
2-1----	e	2L.47	1S.61
2-1----	6883	2L.52	1L.63
2-1----	d	2L.56	1S.78
2-1----	5539	2L.61	1L.21
2-1----	7211	2L.79	1L.57
2-3----	e	2S.76	3L.48
2-3----	5800	2S.73	3S.81
2-3----	5304	2S.62	3L.29
2-3----	c	2S.46	3S.52
2-3----	6270	2S.46	3L.60
2-3----	6862	2S.39	3L.20
2-3----	4369	2S.19	3S.26
2-3----	4301	2ctr.	3ctr.
2-3----	h	2L.14	3L.07
2-3----	I-10	2L.19	3S.51
2-3----	g	2L.21	3S.21
2-3----	7285	2L.26	3L.39
2-3----	f	2L.35	3S.60
2-3----	b	2L.45	3L.08
2-3----	d	2L.67	3L.48
2-3----	4303	2L.73	3L.68
2-3----	6750	2L.76	3S.53

TABLE 3.--Continued.

Trans-location	Symbol	Breakage points	
		Ratio	Ratio
2-3-----	--	2L.79	3S.90
2-3-----	6284	2L.81	3L.75
2-4-----	5157	2S.86	4L.07
2-4-----	4413	2S.84	4S.32
2-4-----	6994	2S.59	4L.95
2-4-----	m	2S.34	4S.47
2-4-----	5495	2S.27	4L.12
2-4-----	j	2S.19	4L.34
2-4-----	k	2L.13	4L.04
2-4-----	g	2L.13	4S.31
2-4-----	4374	2L.15	4L.23
2-4-----	d	2L.17	4L.45
2-4-----	5951	2L.18	4S.26
2-4-----	a	2L.30	4L.21
2-4-----	e	2L.31	4S.47
2-4-----	6266	2L.40	4L.27
2-4-----	l	2L.59	4S.40
2-4-----	f	2L.75	4L.12
2-4-----	b	2L.81	4L.53
2-4-----	c	2L.81	4S.09
2-5-----	g	2S.79	5S.24
2-5-----	4741	2S.47	5L.47
2-5-----	e	2S.19	5S.28
2-5-----	b	2L.06	5S.09
2-5-----	6580	2L.09	5S.09
2-5-----	5098	2L.13	5S.23
2-5-----	a	2L.14	5L.15
2-5-----	c	2L.16	5S.48
2-5-----	A-16	2L.34	5S.30
2-5-----	5876	2L.47	5L.46
2-5-----	5645	2L.60	5S.85
2-5-----	6885	2L.63	5S.79
2-5-----	5602	2L.73	5L.77
2-5-----	d	2L.91	5L.86
2-5-----	f	2L.91	5L.10
2-5-----	4578	2L.92	5S.71
2-6-----	4394	2S.91	6L.12
2-6-----	b	2S.69	6L.49
2-6-----	4372	2S.37	6S.81
2-6-----	5472 & 5473	2S.25	6L.15
2-6-----	6671	2S.22	6L.22
2-6-----	e	2L.18	6L.20
2-6-----	"78"	2L.19	6L.29
2-6-----	6931	2L.24	6L.23
2-6-----	5648	2L.25	6L.19
2-6-----	a	2L.28	6L.20
2-6-----	c	2L.37	6L.25
2-6-----	d	2L.41	6L.45
2-6-----	4717	2L.77	6L.27
2-6-----	f	2L.79	6L.87
2-6-----	5419	2L.82	6S.79
2-7-----	5279	2S.93	7L.25
2-7-----	5144	2S.35	7L.08
2-7-----	6372	2S.21	7L.11
2-7-----	d	2L.16	7L.18
2-7-----	4400	2L.24	7L.32
2-7-----	f	2L.30	7L.68
2-7-----	b	2L.37	7L.12
2-7-----	c	2L.47	7S.34
2-7-----	4519	2L.65	7L.66
2-7-----	5783	2L.66	7L.10
2-7-----	e	2L.82	7L.63
2-8-----	4711	2S.86	8L.67
2-8-----	c	2S.15	8S.11
2-8-----	f	2ctr.	8ctr.
2-8-----	d	2L.05	8L.10
2-8-----	e	2L.07	8L.10
2-8-----	4414	2L.12	8L.14
2-8-----	7069	2L.13	8L.14
2-8-----	b	2L.20	8L.18
2-8-----	5454	2L.21	8S.39
2-8-----	h	2L.23	8L.22
2-8-----	5484	2L.24	8S.58
2-8-----	"84"	2L.32	8L.30
2-8-----	g	2L.71	8S.71
2-9-----	7096	2S.57	9L.66
2-9-----	c	2S.49	9S.33
2-9-----	a	2S.36	9L.58
2-9-----	--	2S.27	9L.72
2-9-----	5711	2S.24	9L.23
2-9-----	b	2S.18	9L.22
2-9-----	5257	2L.28	9L.20
2-9-----	6656	2L.32	9S.31
2-9-----	5831	2L.63	9S.72
2-9-----	5208	2L.76	9L.68
2-9-----	d	2L.83	9L.27
2-10----	5651	2S.71	10L.62
2-10----	b	2S.50	10L.75
2-10----	4484	2ctr.	10L.14
2-10----	5830	2L.12	10L.12
2-10----	a	2L.16	10L.55
2-10----	I-3	2L.30	10S.40
2-10----	5561	2L.35	10S.16
2-10----	6853	2L.79	10L.86

TABLE 3.--Continued.

Translocation	Symbol	Breakage points	
		Ratio	Ratio
3-1-----	d	3S.75	1L.61
3-1-----	5883	3S.60	1S.88
3-1-----	i	3S.30	1L.68
3-1-----	h	3L.04	1S.06
3-1-----	f	3L.11	1L.17
3-1-----	j	3L.13	1L.11
3-1-----	g	3L.13	1L.17
3-1-----	c	3L.14	1S.14
3-1-----	a	3L.17	1S.15
3-1-----	6884	3L.19	1L.17
3-1-----	4759	3L.20	1L.39
3-1-----	k	3L.34	1S.17
3-1-----	e	3L.45	1L.58
3-1-----	5597	3L.48	1S.77
3-1-----	5242	3L.65	1L.90
3-1-----	6861	3L.65	1L.04
3-1-----	5982	3L.66	1S.77
3-1-----	5267	3L.73	1L.72
3-1-----	5476	3L.87	1L.66
3-1-----	4314	3L.89	1L.81
3-2-----	--	3S.90	2L.79
3-2-----	5800	3S.81	2S.73
3-2-----	f	3S.60	2L.35
3-2-----	6750	3S.53	2L.76
3-2-----	c	3S.52	2S.46
3-2-----	I-10	3S.51	2L.19
3-2-----	4369	3S.26	2S.19
3-2-----	g	3S.21	2L.21
3-2-----	4301	3ctr.	2ctr.
3-2-----	h	3L.07	2L.14
3-2-----	b	3L.08	2L.45
3-2-----	6862	3L.20	2S.39
3-2-----	5304	3L.29	2S.62
3-2-----	7285	3L.39	2L.26
3-2-----	e	3L.48	2S.76
3-2-----	d	3L.48	2L.67
3-2-----	6270	3L.60	2S.46
3-2-----	4303	3L.68	2L.73
3-2-----	6284	3L.75	2L.81
3-4-----	5156	3S.47	4L.67
3-4-----	5920	3S.28	4L.73
3-4-----	4662	3S.24	4S.67
3-4-----	4726	3S.16	4L.15
3-4-----	5891	3ctr.	4ctr.
3-4-----	5074	3ctr.	4ctr.
3-4-----	A 21	3L.07	4L.85
3-4-----	4713	3L.21	4S.59
3-4-----	6534	3L.48	4L.89
3-5-----	4635	3S.44	5S.48
3-5-----	e	3S.34	5S.16
3-5-----	6473	3S.32	5S.26
3-5-----	6462	3S.31	5L.47
3-5-----	4873	3S.24	5S.16
3-5-----	4880	3ctr.	5ctr.
3-5-----	6695	3ctr.	5ctr.
3-5-----	4898	3ctr.	5ctr.
3-5-----	g	3L.01	5S.73
3-5-----	5874	3L.16	5L.21
3-5-----	5521	3L.17	5L.48
3-5-----	B-104	3L.23	5L.20
3-5-----	a	3L.28	5L.60
3-5-----	h	3L.55	5L.22
3-5-----	b	3L.61	5L.57
3-5-----	c	3L.62	L.27
3-5-----	7043	3L.63	L.61
3-5-----	6346	3L.94	L.83
3-6-----	b	3S.73	6S.82
3-6-----	4349	3S.58	6L.70
3-6-----	c	3S.56	6L.54
3-6-----	5201	3S.37	6S.82
3-6-----	a	3L.06	6L.30
3-6-----	7067	3L.07	6L.75
3-6-----	6349	3L.10	6L.15
3-6-----	5368	3L.22	6L.20
3-6-----	d	3L.23	6L.82
3-6-----	6566	3L.41	6L.35
3-6-----	7162	3L.52	6L.53
3-7-----	b	3S.92	7L.03
3-7-----	5871	3S.29	7L.13
3-7-----	a	3S.25	7L.18
3-7-----	4670	3S.20	7L.76
3-7-----	4773	3S.11	7L.07
3-7-----	5724	3ctr.	7ctr.
3-7-----	6557	3L.06	7S.59
3-7-----	5955	3L.10	7L.58
3-7-----	5378	3L.13	7L.73
3-7-----	e	3L.25	7S.56
3-7-----	6466	3L.36	7L.14
3-7-----	c	3L.46	7L.45
3-7-----	5471	3L.64	7L.58
3-7-----	d	3L.64	7L.81
3-8-----	6373	3S.53	8L.68
3-8-----	e	3S.36	8L.21
3-8-----	4626	3S.30	8L.31
3-8-----	6439	3S.30	8L.15

TABLE 3.--Continued.

Trans-location	Symbol	Breakage points	
		Ratio	Ratio
3-8-----	5558	3S.26	8S.74
3-8-----	c	3S.23	8L.85
3-8-----	5830	3S.06	8L.13
3-8-----	4872	3ctr.	8ctr.
3-8-----	4303	3ctr.	8ctr.
3-8-----	5583	3L.06	8L.05
3-8-----	7362	3L.07	8L.69
3-8-----	f	3L.08	8L.10
3-8-----	g	3L.12	8L.19
3-8-----	b	3L.16	8L.23
3-8-----	4874	3L.28	8L.32
3-8-----	a	3L.41	8L.61
3-8-----	6261	3L.49	8L.40
3-8-----	h	3L.53	8S.46
3-8-----	B-31	3L.63	8S.06
3-8-----	4340	3L.88	8L.72
3-8-----	4301	3L.92	8L.82
3-9-----	6722	3S.66	9S.66
3-9-----	7041	3S.59	9L.70
3-9-----	5643	3S.55	9L.64
3-9-----	5775	3L.09	9S.24
3-9-----	c	3L.09	9L.12
3-9-----	h	3L.09	9L.33
3-9-----	a	3L.11	9L.16
3-9-----	d	3L.13	9L.26
3-9-----	g	3L.40	9L.14
3-9-----	b	3L.48	9L.53
3-9-----	5285	3L.51	9L.49
3-9-----	4727	3L.54	9L.42
3-9-----	f	3L.63	9S.69
3-9-----	4963	3L.76	9L.57
3-10----	4382	3S.38	10L.29
3-10----	4383	3S.23	10L.30
3-10----	5892	3S.17	10L.25
3-10----	a	3L.16	10L.22
3-10----	b	3L.19	10L.27
3-10----	c	3L.22	10L.30
3-10----	6691	3L.30	10L.87
4-1-----	a	4S.69	1L.51
4-1-----	K-40	4S.42	1S.13
4-1-----	5373	4S.29	1L.17
4-1-----	e	4S.27	1L.45
4-1-----	c	4S.23	1L.33
4-1-----	6422	4S.11	1L.16
4-1-----	5629	4L.10	1L.10
4-1-----	4692	4L.15	1L.46
4-1-----	f	4L.16	1L.25
4-1-----	5566	4L.26	1S.21
4-1----	g	4L.35	1L.95
4-1----	5680	4L.45	1S.87
4-1----	h	4L.52	1S.94
4-1----	4308	4L.58	1S.65
4-1----	5438	4L.81	1L.93
4-1----	5756	4L.81	1L.89
4-1----	b	4L.83	1S.55
4-2----	e	4S.47	2L.31
4-2----	m	4S.47	2S.34
4-2----	l	4S.40	2L.59
4-2----	4413	4S.32	2S.84
4-2----	g	4S.31	2L.13
4-2----	5951	4S.26	2L.18
4-2----	c	4S.09	2L.81
4-2----	k	4L.04	2L.13
4-2----	5157	4L.07	2S.86
4-2----	5495	4L.12	2S.27
4-2----	f	4L.12	2L.75
4-2----	a	4L.21	2L.30
4-2----	4374	4L.23	2L.15
4-2----	6266	4L.27	2L.40
4-2----	j	4L.34	2S.19
4-2----	d	4L.45	2L.17
4-2----	b	4L.53	2L.81
4-2----	6994	4L.95	2S.59
4-3----	4662	4S.67	3S.24
4-3----	4713	4S.59	3L.21
4-3----	5074	4ctr.	3ctr.
4-3----	5891	4ctr.	3ctr.
4-3----	4726	4L.15	3S.16
4-3----	5156	4L.67	3S.47
4-3----	5920	4L.73	3S.28
4-3----	A-21	4L.85	3L.07
4-3----	6534	4L.89	3L.48
4-5----	e	4S.41	5S.32
4-5----	g	4S.38	5L.30
4-5----	5529	4S.37	5L.46
4-5----	c	4S.34	5L.27
4-5----	6831	4S.32	5S.59
4-5----	6560	4S.32	5S.21
4-5----	4305	4S.27	5L.28
4-5----	4472	4S.25	5S.19
4-5----	d	4S.21	5L.22
4-5----	k	4S.06	5L.13
4-5----	7078	4L.05	5L.10
4-5----	i	4L.10	5S.15
4-5----	h	4L.13	5L.08
4-5----	a	4L.19	5S.29

TABLE 3.--Continued.

Trans-location	Symbol	Breakage points	
		Ratio	Ratio
4-5-----	j	4L.21	5L.36
4-5-----	g	4L.27	5S.70
4-5-----	7136	4L.45	5L.33
4-5-----	6743	4L.56	5S.59
4-5-----	b	4L.76	5L.68
4-6-----	4461	4S.86	6L.17
4-6-----	b	4S.80	6L.16
4-6-----	e	4S.62	6L.56
4-6-----	7328	4S.53	6S.89
4-6-----	5227	4S.46	6S.84
4-6-----	4341	4S.37	6S.81
4-6-----	c	4S.33	6S.83
4-6-----	4447	4S.28	6L.14
4-6-----	6623	4L.18	6L.31
4-6-----	a	4L.37	6L.43
4-6-----	d	4L.49	6L.53
4-6-----	7037	4L.61	6S.77
4-7-----	6575	4S.38	7S.32
4-7-----	a	4S.32	7L.07
4-7-----	7108	4S.17	7S.45
4-7-----	4698	4L.08	7L.74
4-7-----	7067	4L.17	7S.60
4-7-----	4483	4L.39	7L.61
4-8-----	a	4S.59	8L.19
4-8-----	4356	4S.40	8L.14
4-8-----	5339	4S.22	8L.71
4-8-----	b	4S.18	8L.16
4-8-----	6063	4S.02	8L.05
4-8-----	5412	4L.59	8L.95
4-8-----	6926	4L.60	8L.71
4-8-----	6363	4L.76	8L.30
4-9-----	e	4S.53	9L.26
4-9-----	4307	4S.48	9L.55
4-9-----	g	4S.27	9L.27
4-9-----	5918	4S.24	9L.18
4-9-----	4304	4S.22	9L.37
4-9-----	6222	4L.03	9S.68
4-9-----	6504	4L.09	9S.83
4-9-----	d	4L.12	9L.17
4-9-----	a	4L.16	9L.58
4-9-----	4373	4L.29	9L.39
4-9-----	5657	4L.33	9S.25
4-9-----	5884	4L.40	9L.49
4-9-----	f	4L.55	9L.18
4-9-----	5828	4L.61	9L.27
4-9-----	5788	4L.72	9L.82
4-9-----	5574	4L.80	9L.87
4-9-----	c	4L.82	9L.29
4-9-----	b	4L.90	9L.29
4-10----	c	4S.64	10L.18
4-10----	d	4S.36	10L.36
4-10----	6662	4L.04	10L.03
4-10----	e	4L.14	10L.14
4-10----	b	4L.15	10L.60
4-10----	6587	4L.55	10L.51
4-10----	f	4L.94	10L.14
5-1-----	5813	5S.96	1L.21
5-1-----	g	5S.85	1L.58
5-1-----	i	5S.74	1S.71
5-1-----	5525	5S.53	1S.75
5-1-----	4597	5S.43	1L.52
5-1-----	a	5L.42	1L.52
5-1-----	7212	5S.28	1L.44
5-1-----	6401	5S.20	1L.14
5-1-----	6899	5S.20	1S.32
5-1-----	5537	5S.15	1S.11
5-1-----	4331	5S.02	1L.03
5-1-----	6197	5L.02	1S.02
5-1-----	6178	5L.05	1L.04
5-1-----	e	5L.09	1L.03
5-1-----	f	5L.09	1L.07
5-1-----	b	5L.10	1S.17
5-1-----	4832	5L.12	1S.20
5-1-----	4613	5L.22	1S.78
5-1-----	c	5L.29	1L.34
5-1-----	5045	5L.50	1S.94
5-1-----	h	5L.53	1L.18
5-1-----	5512	5L.70	1S.08
5-1-----	7267	5L.82	1L.92
5-2-----	5645	5S.85	2L.60
5-2-----	6885	5S.79	2L.63
5-2-----	4578	5S.71	2L.92
5-2-----	c	5S.48	2L.16
5-2-----	A-16	5S.30	2L.34
5-2-----	e	5S.28	2S.19
5-2-----	g	5S.24	2S.79
5-2-----	5098	5S.23	2L.13
5-2-----	b	5S.09	2L.06
5-2-----	6580	5S.09	2L.09
5-2-----	f	5L.10	2L.91
5-2-----	a	5L.15	2L.14
5-2-----	4741	5L.47	2S.47
5-2-----	5876	5L.47	2L.47
5-2-----	5602	5L.77	2L.73
5-2-----	d	5L.86	2L.91

TABLE 3.--Continued.

Translocation	Symbol	Breakage points	
		Ratio	Ratio
5-3-----	g	5S.73	3L.01
5-3-----	4635	5S.48	3S.44
5-3-----	6473	5S.26	3S.32
5-3-----	4873	5S.16	3S.24
5-3-----	e	5S.16	3S.34
5-3-----	4880	5ctr.	3ctr.
5-3-----	6695	5ctr.	3ctr.
5-3-----	4898	5ctr.	3ctr.
5-3-----	B-104	5L.20	3L.23
5-3-----	5874	5L.21	3L.16
5-3-----	h	5L.22	3L.55
5-3-----	c	5L.27	3L.62
5-3-----	6462	5L.47	3S.31
5-3-----	5521	5L.48	3L.17
5-3-----	b	5L.57	3L.61
5-3-----	a	5L.60	3L.28
5-3-----	7043	5L.61	3L.63
5-3-----	6346	5L.83	3L.94
5-4-----	g	5S.70	4L.27
5-4-----	6831	5S.59	4S.32
5-4-----	6743	5S.59	4L.56
5-4-----	e	5S.32	4S.41
5-4-----	a	5S.29	4L.19
5-4-----	6560	5S.21	4S.32
5-4-----	4472	5S.19	4S.25
5-4-----	i	5S.15	4L.10
5-4-----	h	5L.08	4L.13
5-4-----	7078	5L.10	4L.05
5-4-----	k	5L.13	4S.06
5-4-----	d	5L.22	4S.21
5-4-----	c	5L.27	4S.34
5-4-----	4305	5L.28	4S.27
5-4-----	g	5L.30	4S.38
5-4-----	7136	5L.33	4L.45
5-4-----	j	5L.36	4L.21
5-4-----	5529	5L.46	4S.37
5-4-----	b	5L.68	4L.76
5-6-----	5622	5S.94	6L.42
5-6-----	6522	5S.87	6L.70
5-6-----	6559	5S.72	6L.09
5-6-----	d	5S.64	6S.89
5-6-----	f	5S.37	6S.76
5-6-----	4933	5S.23	6L.89
5-6-----	6482	5S.22	6S.77
5-6-----	5765	5S.19	6L.32
5-6-----	5906	5S.15	6L.13
5-6-----	e	5L.11	6L.60
5-6-----	4669	5L.13	6L.40
5-6-----	6062	5L.20	6L.78
5-6-----	5685	5L.27	6L.20
5-6-----	4934	5L.34	6L.89
5-6-----	4666	5L.35	6L.86
5-6-----	a	5L.35	6L.43
5-6-----	b	5L.72	6L.21
5-6-----	c	5L.81	6L.08
5-7-----	d	5S.63	7S.33
5-7-----	5143	5S.51	7L.10
5-7-----	e	5S.40	7S.18
5-7-----	4306	5S.32	7L.35
5-7-----	b	5L.18	7S.36
5-7-----	6293	5L.26	7L.63
5-7-----	c	5L.42	7L.72
5-7-----	5179	5L.55	7L.73
5-7-----	a	5L.78	7L.72
5-7-----	f	5L.80	7L.85
5-8-----	5013	5S.67	8L.59
5-8-----	6612	5S.59	8L.66
5-8-----	d	5S.55	8L.12
5-8-----	5570	5S.47	8S.35
5-8-----	c	5S.24	8L.20
5-8-----	b	5S.23	8L.23
5-8-----	5575	5S.21	8S.22
5-8-----	7068	5S.18	8L.18
5-8-----	5777	5S.13	8L.19
5-8-----	6402	5S.07	8L.07
5-8-----	A-50	5S.07	8L.11
5-8-----	6406	5ctr.	8ctr.
5-8-----	f	5L.02	8S.08
5-8-----	4302	5L.06	8S.11
5-8-----	6289	5L.06	8L.54
5-8-----	4636	5L.23	8L.79
5-8-----	g	5L.28	8S.44
5-8-----	5866	5L.32	8L.77
5-8-----	7102	5L.48	8S.10
5-8-----	a	5L.49	8S.58
5-9-----	B-91	5S.23	9L.21
5-9-----	B-94	5S.17	9L.27
5-9-----	6057	5S.15	9S.52
5-9-----	c	5S.07	9L.10
5-9-----	4817	5L.06	9S.07
5-9-----	5614	5L.09	9L.06
5-9-----	d	5L.14	9L.10
5-9-----	7205	5L.21	9L.90
5-9-----	4790	5L.34	9L.45
5-9-----	4305	5L.41	9L.64
5-9-----	e	5L.46	9L.74
5-9-----	4352	5L.48	9L.61

TABLE 3.--Continued.

Trans-location	Symbol	Breakage points	
		Ratio	Ratio
5-9-----	b	5L.68	9L.44
5-9-----	a	5L.69	9S.17
5-9-----	4871	5L.71	9S.38
5-9-----	6200	5L.81	9L.71
5-9-----	5368	5L.87	9L.95
5-10----	6760	5S.78	10S.40
5-10----	5355	5S.77	10L.45
5-10----	5653	5S.76	10L.71
5-10----	6061	5S.60	10L.57
5-10----	X-57-16	5S.42	10L.42
5-10----	5679	5S.16	10L.15
5-10----	6830	5ctr.	10ctr.
5-10----	b	5L.09	10S.25
5-10----	5358	5L.10	10L.76
5-10----	4384	5L.13	10L.79
5-10----	a	5L.14	10S.54
5-10----	5188	5L.37	10S.65
5-10----	7142	5L.73	10L.17
5-10----	5290	5L.78	10S.49
5-10----	5688	5L.78	10L.53
5-10----	4801	5L.91	10L.23
5-10----	5557	5L.92	10S.39
6-1-----	5495	6S.80	1S.25
6-1-----	4986	6S.78	1S.21
6-1-----	d	6S.74	1L.13
6-1-----	6189	6L.17	1S.23
6-1-----	h	6L.17	1L.03
6-1-----	e	6L.21	1S.37
6-1-----	5537	6L.22	1S.31
6-1-----	c	6L.27	1S.25
6-1-----	5013	6L.28	1S.26
6-1-----	4456	6L.30	1L.71
6-1-----	f	6L.42	1L.32
6-1-----	5072	6L.45	1S.17
6-1-----	a	6L.54	1L.20
6-1-----	5077	6L.60	1S.20
6-1-----	7097	6L.62	1S.46
6-1-----	5225	6L.72	1L.61
6-1-----	g	6L.84	1L.16
6-2-----	4372	6S.81	2S.37
6-2-----	5419	6S.79	2L.82
6-2-----	4394	6L.12	2S.91
6-2-----	5472 & 73	6L.15	2S.25
6-2-----	5648	6L.19	2L.25
6-2-----	e	6L.20	2L.18
6-2-----	a	6L.20	2L.28
6-2-----	6671	6L.22	2S.22
6-2-----	6931	6L.23	2L.24
6-2-----	c	6L.25	2L.37
6-2-----	4717	6L.27	2L.77
6-2-----	"78"	6L.29	2L.19
6-2-----	d	6L.45	2L.41
6-2-----	b	6L.49	2S.69
6-2-----	f	6L.87	2L.79
6-3-----	b	6S.82	3S.73
6-3-----	5201	6S.82	3S.37
6-3-----	6349	6L.15	3L.10
6-3-----	5368	6L.20	3L.22
6-3-----	a	6L.30	3L.06
6-3-----	6566	6L.35	3L.41
6-3-----	c	6L.54	3S.56
6-3-----	7162	6L.53	3L.52
6-3-----	4349	6L.70	3S.58
6-3-----	7067	6L.75	3L.07
6-3-----	d	6L.82	3L.23
6-4-----	7328	6S.89	4S.53
6-4-----	5227	6S.84	4S.46
6-4-----	c	6S.83	4S.33
6-4-----	4341	6S.81	4S.37
6-4-----	7037	6S.77	4L.61
6-4-----	4447	6L.14	4S.28
6-4-----	b	6L.16	4S.80
6-4-----	4461	6L.17	4S.86
6-4-----	6623	6L.31	4L.18
6-4-----	a	6L.43	4L.37
6-4-----	d	6L.53	4L.49
6-4-----	e	6L.56	4S.62
6-5-----	d	6S.89	5S.64
6-5-----	6482	6S.77	5S.22
6-5-----	f	6S.76	5S.37
6-5-----	c	6L.08	5L.81
6-5-----	6559	6L.09	5S.72
6-5-----	5906	6L.13	5S.15
6-5-----	5685	6L.20	5L.27
6-5-----	b	6L.21	5L.72
6-5-----	5765	6L.32	5S.19
6-5-----	4669	6L.40	5L.13
6-5-----	5622	6L.42	5S.94
6-5-----	a	6L.43	5L.35
6-5-----	e	6L.60	5L.11
6-5-----	6522	6L.70	5S.87
6-5-----	6062	6L.78	5L.20
6-5-----	4666	6L.86	5L.35
6-5-----	4933	6L.89	5S.23
6-5-----	4934	6L.89	5L.34

TABLE 3.--Continued.

Translocation	Symbol	Breakage points	
		Ratio	Ratio
6-7------	7036	6S.90	7L.63
6-7------	5181	6S.79	7L.86
6-7------	4964	6S.76	7L.72
6-7------	6498	6L.16	7S.48
6-7------	4573	6L.22	7L.27
6-7------	4545	6L.25	7S.73
6-7------	6885	6L.33	7S.58
6-7------	4337	6L.37	7L.13
6-7------	6598	6L.43	7L.61
6-7------	4594	6L.52	7S.67
6-7------	a	6L.73	7L.68
6-8------	5386	6S.78	8S.83
6-8------	6187	6L.19	8L.51
6-8------	6873	6L.21	8L.29
6-8------	5028	6L.21	8L.31
6-8------	c	6L.27	8L.50
6-8------	5605	6L.36	8L.22
6-8------	a	6L.41	8L.80
6-8------	d	6L.51	8L.77
6-8------	b	6L.79	8S.76
6-9------	a	6S.79	9L.40
6-9------	4778	6S.80	9L.30
6-9------	d	6S.73	9L.82
6-9------	5454	6ctr.	9S.75
6-9------	b	6L.10	9S.37
6-9------	4505	6L.13	9ctr.
6-9------	c	6L.15	9L.29
6-9------	e	6L.18	9L.24
6-9------	6270	6L.19	9L.28
6-9------	6019	6L.27	9L.26
6-9------	5831	6L.27	9L.30
6-9------	5964	6L.47	9L.83
6-10-----	f	6S.92	10S.28
6-10-----	5253	6S.80	10L.41
6-10-----	5519	6S.75	10L.17
6-10-----	b	6L.12	10L.29
6-10-----	e	6L.14	10S.43
6-10-----	d	6L.16	10L.29
6-10-----	h	6L.47	10L.87
6-10-----	c	6L.51	10S.36
6-10-----	4347	6L.65	10S.81
6-10-----	4307	6L.74	10S.71
6-10-----	a	6L.75	10L.15
6-10-----	4833	6L.83	10S.78
6-10-----	g	6L.85	10L.20
6-10-----	5780	6L.93	10L.13
7-1------	f	7S.50	1S.10
7-1------	4444	7S.50	1S.65
7-1-----	4405	7S.46	1S.43
7-1-----	d	7S.44	1L.81
7-1-----	6796	7S.39	1S.40
7-1-----	g	7S.22	1S.79
7-1-----	b	7S.12	1L.53
7-1-----	4742	7L.03	1S.95
7-1-----	e	7L.11	1L.39
7-1-----	4302	7L.12	1S.15
7-1-----	a	7L.13	1L.28
7-1-----	5339	7L.14	1L.24
7-1-----	c	7L.14	1L.39
7-1-----	5693	7L.18	1L.92
7-1-----	h	7L.19	1L.46
7-1-----	i	7L.26	1S.31
7-1-----	4837	7L.55	1S.73
7-1-----	A-37	7L.56	1L.10
7-1-----	j	7L.61	1L.20
7-1-----	4891	7L.69	1L.12
7-1-----	f	7L.80	1S.72
7-1-----	4420	7L.90	1L.47
7-2-----	c	7S.34	2L.47
7-2-----	5144	7L.08	2S.35
7-2-----	5783	7L.10	2L.66
7-2-----	6372	7L.11	2S.21
7-2-----	b	7L.12	2L.37
7-2-----	d	7L.18	2L.16
7-2-----	5279	7L.25	2S.93
7-2-----	4400	7L.32	2L.24
7-2-----	e	7L.63	2L.82
7-2-----	4519	7L.66	2L.65
7-2-----	f	7L.68	2L.30
7-3-----	6557	7S.59	3L.06
7-3-----	e	7S.56	3L.25
7-3-----	5724	7ctr.	3ctr.
7-3-----	b	7L.03	3S.92
7-3-----	4773	7L.08	3S.11
7-3-----	6466	7L.14	3L.36
7-3-----	5871	7L.13	3S.29
7-3-----	a	7L.18	3S.25
7-3-----	c	7L.45	3L.46
7-3-----	5471	7L.58	3L.64
7-3-----	5955	7L.58	3L.10
7-3-----	5378	7L.73	3L.13
7-3-----	4670	7L.76	3S.20
7-3-----	d	7L.81	3L.64
7-4-----	7067	7S.60	4L.17
7-4-----	7108	7S.45	4S.17
7-4-----	6575	7S.32	4S.38

TABLE 3.--Continued.

Trans-location	Symbol	Breakage points	
		Ratio	Ratio
7-4------	a	7L.07	4S.32
7-4------	4483	7L.61	4L.39
7-4------	4698	7L.74	4L.08
7-5------	b	7S.36	5L.18
7-5------	d	7S.33	5S.63
7-5------	e	7S.18	5S.40
7-5------	5143	7L.10	5S.51
7-5------	4306	7L.35	5S.32
7-5------	6293	7L.63	5L.26
7-5------	c	7L.72	5L.42
7-5------	a	7L.72	5L.78
7-5------	5179	7L.73	5L.55
7-5------	f	7L.85	5L.80
7-6------	4545	7S.73	6L.25
7-6------	4594	7S.67	6L.52
7-6------	6885	7S.58	6L.33
7-6------	6498	7S.48	6L.16
7-6------	4337	7L.13	6L.37
7-6------	4573	7L.27	6L.22
7-6------	6598	7L.61	6L.43
7-6------	7036	7L.63	6S.90
7-6------	a	7L.68	6L.73
7-6------	4964	7L.72	6S.76
7-6------	5181	7L.86	6S.79
7-8------	6981	7S.46	8L.09
7-8------	5828	7S.31	8L.10
7-8------	6531	7ctr.	8ctr.
7-8------	5499	7L.05	8L.08
7-8------	5413	7L.09	8L.77
7-8------	6981	7L.14	8S.49
7-8------	4536	7L.34	8L.47
7-8------	7149	7L.56	8L.65
7-8------	5479	7L.70	8S.21
7-8------	4824	7L.83	8L.25
7-8------	6427	7L.96	8L.28
7-9------	b	7S.76	9S.19
7-9------	5074	7S.48	9L.53
7-9------	4363	7ctr.	9ctr.
7-9------	6225	7ctr.	9ctr.
7-9------	6482	7L.01	9S.97
7-9------	7074	7L.03	9S.80
7-9------	c	7L.14	9L.22
7-9------	6978	7L.62	9S.83
7-9------	a	7L.63	9S.07
7-9------	5381	7L.85	9L.78
7-10-----	a	7L.23	10L.06
7-10-----	4356	7L.70	10ctr.
7-10-----	4422	7L.79	10ctr.

Trans-location	Symbol	Breakage points	
		Ratio	Ratio
8-1-----	5704	8S.67	1L.96
8-1-----	a	8S.52	1L.41
8-1-----	6591	8S.43	1S.18
8-1-----	5588	8S.31	1S.10
8-1-----	5634	8S.28	1L.08
8-1-----	4676	8S.06	1L.04
8-1-----	4748	8L.15	1L.12
8-1-----	5619	8L.16	1L.07
8-1-----	4685	8L.21	1S.20
8-1-----	5752	8L.23	1L.36
8-1-----	5821	8L.31	1L.65
8-1-----	6697	8L.52	1L.89
8-1-----	5384	8L.59	1L.10
8-1-----	4307	8L.61	1S.42
8-1-----	5910	8L.67	1L.93
8-1-----	6766	8L.77	1L.54
8-1-----	b	8L.82	1L.59
8-1-----	c	8L.89	1L.94
8-2-----	g	8S.71	2L.71
8-2-----	5484	8S.58	2L.24
8-2-----	5454	8S.39	2L.21
8-2-----	c	8S.11	2S.15
8-2-----	f	8ctr.	2ctr.
8-2-----	d	8L.10	2L.05
8-2-----	e	8L.10	2L.07
8-2-----	4414	8L.14	2L.12
8-2-----	7069	8L.14	2L.13
8-2-----	b	8L.18	2L.20
8-2-----	h	8L.22	2L.23
8-2-----	"84"	8L.30	2L.32
8-2-----	4711	8L.67	2S.86
8-3-----	5558	8S.74	3S.26
8-3-----	h	8S.46	3L.53
8-3-----	B-31	8S.06	3L.63
8-3-----	4872	8ctr.	3ctr.
8-3-----	4303	8ctr.	3ctr.
8-3-----	5583	8L.05	3L.06
8-3-----	f	8L.10	3L.08
8-3-----	5830	8L.13	3S.06
8-3-----	6439	8L.15	3S.30
8-3-----	g	8L.19	3L.12
8-3-----	e	8L.21	3S.36
8-3-----	b	8L.23	3L.16
8-3-----	4626	8L.31	3S.30
8-3-----	4874	8L.32	3L.28
8-3-----	6261	8L.40	3L.49
8-3-----	a	8L.61	3L.41
8-3-----	6373	8L.68	3S.53
8-3-----	7362	8L.69	3S.07

TABLE 3.--Continued.

Trans-location	Symbol	Breakage points	
		Ratio	Ratio
8-3------	4340	8L.72	3L.88
8-3------	4301	8L.82	3L.92
8-3------	c	8L.85	3S.23
8-4------	6063	8L.05	4S.02
8-4------	4356	8L.14	4S.40
8-4------	b	8L.16	4S.18
8-4------	a	8L.19	4S.59
8-4------	6363	8L.30	4L.76
8-4------	5339	8L.71	4S.22
8-4------	6926	8L.71	4L.60
8-4------	5412	8L.95	4L.59
8-5------	a	8S.58	5L.49
8-5------	g	8S.44	5L.28
8-5------	5570	8S.35	5S.47
8-5------	5575	8S.22	5S.21
8-5------	4302	8S.11	5L.06
8-5------	7102	8S.10	5L.48
8-5------	f	8S.08	5L.02
8-5------	6406	8ctr.	5ctr.
8-5------	6402	8L.07	5S.07
8-5------	A-50	8L.11	5S.07
8-5------	d	8L.12	5S.55
8-5------	7068	8L.18	5S.18
8-5------	5777	8L.19	5S.13
8-5------	c	8L.20	5S.24
8-5------	b	8L.23	5S.23
8-5------	6289	8L.54	5L.06
8-5------	5013	8L.59	5S.67
8-5------	6612	8L.66	5S.59
8-5------	5866	8L.77	5L.32
8-5------	4636	8L.79	5L.23
8-6------	5386	8S.83	6S.78
8-6------	b	8S.76	6L.79
8-6------	5605	8L.22	6L.36
8-6------	6873	8L.29	6L.21
8-6------	5028	8L.31	6L.21
8-6------	c	8L.50	6L.27
8-6------	6187	8L.51	6L.19
8-6------	d	8L.77	6L.51
8-6------	a	8L.80	6L.41
8-7------	6981	8S.49	7L.14
8-7------	5479	8S.21	7L.70
8-7------	6531	8ctr.	7ctr.
8-7------	5499	8L.08	7L.05
8-7------	6981	8L.09	7S.46
8-7------	5828	8L.10	7S.31
8-7------	4824	8L.25	7L.83
8-7-----	6427	8L.28	7L.96
8-7-----	4536	8L.47	7L.34
8-7-----	7149	8L.65	7L.56
8-7-----	5413	8L.77	7L.09
8-9-----	b	8S.67	9L.75
8-9-----	4643	8S.37	9L.11
8-9-----	e	8S.32	9L.25
8-9-----	c	8ctr.	9ctr.
8-9-----	5391	8L.07	9S.33
8-9-----	d	8L.09	9S.16
8-9-----	a	8L.13	9L.38
8-9-----	6673	8L.35	9S.31
8-9-----	4775	8L.42	9L.68
8-9-----	4593	8L.69	9L.65
8-9-----	4713	8L.70	9ctr.
8-9-----	6921	8L.85	9L.15
8-9-----	5300	8L.85	9S.43
8-9-----	4453	8L.86	9S.68
8-10----	b	8ctr.	10ctr.
8-10----	5585	8ctr.	10ctr.
8-10----	6653	8L.04	10L.06
8-10----	K-7	8L.07	10S.22
8-10----	6488	8L.14	10L.34
8-10----	5287	8L.17	10S.33
8-10----	d	8L.39	10L.16
8-10----	c	8L.41	10S.56
8-10----	6128	8L.43	10S.47
8-10----	a	8L.48	10S.48
8-10----	5944	8L.75	10L.40
8-10----	e	8L.84	10S.37
9-1-----	4997	9S.28	1L.37
9-1-----	4995	9S.20	1L.19
9-1-----	4398	9S.19	1L.51
9-1-----	5622	9L.12	1L.10
9-1-----	a	9L.15	1S.13
9-1-----	c	9L.22	1S.48
9-1-----	d	9L.25	1L.42
9-1-----	6328	9L.40	1L.79
9-1-----	6762	9L.53	1S.16
9-1-----	b	9L.60	1L.50
9-2-----	5831	9S.72	2L.63
9-2-----	c	9S.33	2S.49
9-2-----	6656	9S.31	2L.32
9-2-----	5257	9L.20	2L.28
9-2-----	b	9L.22	2S.18
9-2-----	5711	9L.23	2S.24
9-2-----	d	9L.27	2L.83

TABLE 3.--Continued.

Trans-location	Symbol	Breakage points	
		Ratio	Ratio
9-2------	a	9L.58	2S.36
9-2------	7096	9L.66	2S.57
9-2------	5208	9L.68	2L.76
9-2------	--	9L.72	2S.27
9-3------	f	9S.69	3L.63
9-3------	6722	9S.66	3S.66
9-3------	5775	9S.24	3L.09
9-3------	c	9L.12	3L.09
9-3------	g	9L.14	3L.40
9-3------	a	9L.16	3L.11
9-3------	d	9L.26	3L.13
9-3------	h	9L.33	3L.09
9-3------	4727	9L.42	3L.54
9-3------	5285	9L.49	3L.51
9-3------	b	9L.53	3L.48
9-3------	4963	9L.57	3L.76
9-3------	5643	9L.64	3S.55
9-3------	7041	9L.70	3S.59
9-4------	6504	9S.83	4L.09
9-4------	6222	9S.68	4L.03
9-4------	5657	9S.25	4L.33
9-4------	d	9L.17	4L.12
9-4------	5918	9L.18	4S.24
9-4------	f	9L.18	4L.55
9-4------	e	9L.26	4S.53
9-4------	g	9L.27	4S.27
9-4------	5828	9L.27	4L.61
9-4------	c	9L.29	4L.82
9-4------	b	9L.29	4L.90
9-4------	4304	9L.37	4S.22
9-4------	4373	9L.39	4L.29
9-4------	5884	9L.49	4L.40
9-4------	4307	9L.55	4S.48
9-4------	a	9L.58	4L.16
9-4------	5788	9L.82	4L.72
9-4------	5574	9L.87	4L.80
9-5------	6057	9S.52	5S.15
9-5------	4871	9S.38	5L.71
9-5------	a	9S.17	5L.69
9-5------	4817	9S.07	5L.06
9-5------	5614	9L.06	5L.09
9-5------	c	9L.10	5S.07
9-5------	d	9L.10	5L.14
9-5------	B-91	9L.21	5S.23
9-5------	B-94	9L.27	5S.17
9-5------	b	9L.44	5L.68
9-5------	4790	9L.45	5L.34
9-5------	4352	9L.61	5L.48
9-5-----	4305	9L.64	5L.41
9-5-----	6200	9L.71	5L.81
9-5-----	e	9L.74	5L.46
9-5-----	7205	9L.90	5L.21
9-5-----	5368	9L.95	5L.87
9-6-----	5454	9S.75	6ctr.
9-6-----	b	9S.37	6L.10
9-6-----	4505	9ctr.	6L.13
9-6-----	e	9L.24	6L.18
9-6-----	6019	9L.26	6L.27
9-6-----	6270	9L.28	6L.19
9-6-----	c	9L.29	6L.15
9-6-----	5831	9L.30	6L.27
9-6-----	4778	9L.30	6S.80
9-6-----	a	9L.40	6S.79
9-6-----	d	9L.82	6S.73
9-6-----	5964	9L.82	6S.47
9-7-----	6482	9S.97	7L.01
9-7-----	6978	9S.83	7L.62
9-7-----	7074	9S.80	7L.03
9-7-----	b	9S.19	7S.76
9-7-----	a	9S.07	7L.63
9-7-----	4363	9ctr.	7ctr.
9-7-----	6225	9ctr.	7ctr.
9-7-----	c	9L.22	7L.14
9-7-----	5074	9L.53	7S.48
9-7-----	5381	9L.78	7L.85
9-8-----	4453	9S.68	8L.86
9-8-----	5300	9S.43	8L.85
9-8-----	5391	9S.33	8L.07
9-8-----	6673	9S.31	8L.35
9-8-----	d	9S.16	8L.09
9-8-----	c	9ctr.	8ctr.
9-8-----	4713	9ctr.	8L.70
9-8-----	4643	9L.11	8S.37
9-8-----	6921	9L.15	8L.85
9-8-----	e	9L.25	8S.32
9-8-----	a	9L.38	8L.13
9-8-----	4593	9L.65	8L.69
9-8-----	4775	9L.68	8L.42
9-8-----	b	9L.75	8S.67
9-10----	b	9S.13	10S.40
9-10----	a	9L.14	10L.92
9-10----	A-75	9L.24	10L.30
9-10----	4303	9L.26	10S.44
9-10----	5488	9L.57	10L.89
9-10----	7103	9L.73	10L.88

TABLE 3.--Continued.

Trans-location	Symbol	Breakage points	
		Ratio	Ratio
10-1-----	b	10S.39	1L.19
10-1-----	4885	10ctr.	1ctr.
10-1-----	g	10L.21	1S.80
10-1-----	B-29	10L.26	1L.93
10-1-----	f	10L.30	1S.04
10-1-----	e	10L.31	1L.16
10-1-----	a	10L.33	1L.29
10-1-----	d	10L.68	1L.50
10-1-----	5273	10L.69	1L.17
10-1-----	c	10L.74	1L.43
10-2-----	13	10S.40	2L.30
10-2-----	5561	10S.16	2L.35
10-2-----	5830	10L.12	2L.12
10-2-----	4484	10L.14	2ctr.
10-2-----	a	10L.55	2L.16
10-2-----	5651	10L.62	2S.71
10-2-----	b	10L.75	2S.50
10-2-----	6853	10L.86	2L.79
10-3-----	a	10L.22	3L.16
10-3-----	5892	10L.25	3S.17
10-3-----	b	10L.27	3L.19
10-3-----	4382	10L.29	3S.38
10-3-----	4383	10L.30	3S.23
10-3-----	c	10L.30	3L.22
10-3-----	6691	10L.87	3L.30
10-4-----	6662	10L.03	4L.04
10-4-----	e	10L.14	4L.14
10-4-----	f	10L.14	4L.94
10-4-----	c	10L.18	4S.64
10-4-----	d	10L.36	4S.36
10-4-----	6587	10L.53	4L.55
10-4-----	b	10L.60	4L.15
10-5-----	5188	10S.65	5L.37
10-5-----	a	10S.54	5L.14
10-5-----	5290	10S.49	5L.78
10-5-----	6760	10S.40	5S.78
10-5-----	5557	10S.39	5L.92
10-5-----	b	10S.25	5L.09
10-5-----	6830	10ctr.	5ctr.
10-5-----	5679	10L.15	5S.16
10-5-----	7142	10L.17	5L.73
10-5-----	4801	10L.23	5L.91
10-5----	X-57-16	10L.42	5S.42
10-5----	5355	10L.45	5S.77
10-5----	5688	10L.53	5L.78
10-5----	6061	10L.57	5S.60
10-5----	5653	10L.71	5S.76
10-5----	5358	10L.76	5L.10
10-5----	4384	10L.79	5L.13
10-6----	4347	10S.81	6L.65
10-6----	4833	10S.78	6L.83
10-6----	4307	10S.71	6L.74
10-6----	e	10S.43	6L.14
10-6----	c	10S.36	6L.51
10-6----	f	10S.28	6S.92
10-6----	5780	10L.13	6L.93
10-6----	5519	10L.17	6S.75
10-6----	a	10L.15	6L.75
10-6----	g	10L.20	6L.85
10-6----	b	10L.29	6L.12
10-6----	d	10L.29	6L.16
10-6----	5253	10L.41	6S.80
10-6----	h	10L.87	6L.47
10-7----	4422	10ctr.	7L.79
10-7----	4356	10ctr.	7L.70
10-7----	a	10L.06	7L.23
10-8----	c	10S.56	8L.41
10-8----	a	10S.48	8L.48
10-8----	6128	10S.47	8L.43
10-8----	e	10S.37	8L.84
10-8----	6488	10S.34	8L.14
10-8----	5287	10S.33	8L.17
10-8----	K-7	10S.22	8L.07
10-8----	b	10ctr.	8ctr.
10-8----	5585	10ctr.	8ctr.
10-8----	6653	10L.06	8L.04
10-8----	d	10L.16	8L.39
10-8----	5944	10L.40	8L.75
10-9----	4303	10S.44	9L.26
10-9----	b	10S.40	9S.13
10-9----	A-75	10L.30	9L.24
10-9----	7103	10L.88	9L.73
10-9----	5488	10L.89	9L.57
10-9----	a	10L.92	9L.14